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ABSTRACT

This is a collection of selected articles from "DGWS (Division for Girls and Women's Sports) Archery Guides" and the "Journal of Health, Physical Education, and Recreation." Included are materials on the historical background of archery, the selection and care of equipment, methods for improving skills at all levels, safety rules, archery programs, tournaments and clinics, archery for the physically handicapped, and field shooting. (JA)

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SPORTS ARTICLES REPRINT SERIES

Selected Archery Articles

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SP 006 732

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PREFACE

Archery is as exciting and challenging for modern man as it has been for man throughout the history of civilization. Man in primitive, agrarian, or industrialized societies continues to seek the pleasure and self-fulfillment derived from participation in this fascinating sport.

Archery's relevance for modern man makes this first edition of Selected Archery Articles a much needed addition to the DGWS Sports Articles Reprint Series. This collection of outstanding articles has been compiled from previous DGWS *Archery Guides* and the *Journal of Health, Physical Education, Recreation.*

All articles were carefully selected for their potential value to the archer, the teacher, and the coach. An effort was made to include material which covers many aspects of the sport, such as the historical background, the selection and care of equipment, and instructional methods for improving skill at all levels. In addition, suggestions are included that offer a greater variety of shooting opportunities for all participants.

My sincere appreciation to DGWS for the opportunity to prepare this publication for the archery enthusiast.

Margaret L. Driscoll
Editor

TEN COMMANDMENTS FOR ARCHERS

1. LET US KEEP OURSELVES AS OUR *ARROWS* – STRAIGHT.
2. LET US NOT BE TOO PROUD TO BEND BACKWARDS – AS OUR *BOW* – TO BE FRIENDLY.
3. LET US ADJUST OUR *SIGHTS* SO THAT OUR AIMS WILL BE FOR GOOD.
4. LET US *HOLD* TO GOOD SPORTSMANSHIP.
5. LET US *RELEASE* OUR ARROWS AND THOUGHTS WITHOUT FAULT.
6. LET US *FOLLOW THRU* ALL IDEAS FOR THE ADVANCEMENT OF ARCHERY.
7. LET US BE AS CONSIDERATE TO OTHERS AS WE ARE TO OUR *TACKLE.*
8. LET US *NOCK* OUR ARROWS – NOT KNOCK OTHERS.
9. LET US REMEMBER, UNKIND WORDS PIERCE DEEPER THAN AN *ARROW* SHOT FROM THE MOST POWERFUL *BOW.*
10. LET US INCLUDE IN OUR *TACKLE BOX* SMILES, KINDNESS, FRIENDLINESS, WIT, AND LOVE.

by George J. DelaHaye

History

A Story of Archery

HENRY S. C. CUMMINGS
Newton Centre, Massachusetts

A great deal could be written on the antiquity of archery. Bows and arrows were the weapons which primitive peoples used before the advent of firearms. They were a symbol of strength and have often appeared on the coats of arms and seals of communities, including our own country. A bundle of 13 arrows with an olive branch appears on the Seal of the United States, adopted in 1782. A revision of the Seal in 1841, and a further revision in 1877, reduced the number of arrows to six.

We learn from the book *Anecdotes of Archery* by Hargrove (1845) that in 1537, Henry VIII, who was fond of archery, commissioned his Master of Ordnance, Sir Christopher Morris, to revive it as a pastime by establishing a Society of Archers under the name of the Fraternity, or Guild, of St. George. This group was to oversee the use of the longbow, the crossbow, and hand guns. It was the forerunner of the Honourable Artillery Company, which was organized in 1585. In the course of time, the Archer's Division in this company was abolished except for a group called the Finsbury Archers, which flourished between 1671 and 1780. This group later became known as the Toxophilite Society and, today, as the Royal Toxophilite Society. Calling themselves St. George's Bowmen, members of this society joined forces with the battalion of the Honourable Artillery Company, of which the Ancient and Honourable Artillery Company, now in existence is believed to have been an outgrowth.

Many archery societies prospered in England 350 years ago. There were, for instance, the Royal Edinburgh Archers, organized in 1600; the Finsbury in 1673. The earliest known archery society in the United States was founded by the United Bowmen of Philadelphia in 1828.

Perhaps more than to any others, archery in America owes its existence to two very young gentlemen from Georgia in the Confederate Army. They were Maurice and Will Thompson. Dr. Robert P. Elmer tells us in his book, *Archery*, that Maurice was wounded in the chest near the end of the war. As soon as he was able to walk, he and Will started for home on foot. When they got there after peace had been declared, they found that Sherman had laid waste their whole plantation during his march to the sea. They had no money

and their old doctor told Maurice that, because of his thoracic lesion, he should live in the open air. Firearms were denied to the two brothers on account of their recent belligerency, and so they went out into the woods, chiefly in Florida, and lived for the most part on game that they killed with the bow and arrow. Will Thompson later became a prominent attorney. With easy and beautiful eloquence, he often told the story of how they scraped the bowls down with knives and stones and rubbed them with sand to make them smooth. This was a simple and natural enough procedure, but this peculiar gift of speech seemed to give the story the glamour of pathos and romance. Maurice also possessed this ability – but to an even greater extent. A few years later, he wrote a series of short stories on his experiences, which were published in *Harpers Magazine* during 1877 and 1878, and faterwards collected in a volume called *The Witchery of Archery*.

At that time, the only outdoor game was croquet, nearly as bad a state of affairs as in the time of Titian Peale, when the only games were ten pins and billards. Excited and interested by the charm of Thompson's stories, people welcomed archery with enthusiasm as a real sport – the first to enliven the placidity of mid-Victorian life. The idea of organizing an association on the lines of the Grand National Archery Society of England, founded in 1861, led to the formation of the National Archery Association in 1879. With the exception of the National Rifle Association established in 1871, and the National Oarsmen in 1872, the National Archery Association is the oldest national sporting organization in the United States.

Archery is one of the very few sports that is flexible enough to appeal to all ages, both sexes, and to those with strength as well as those with physical handicaps. It is also a sport with therapeutic qualities, helping to improve posture and maintain general physical fitness. It can be indulged in creatively and even has a spiritual potential. In this connection, I should like to digress briefly on William B. Akers' book, *The Fundamentals of Japanese Archery* (1937).

In this book, touching on the spiritual training to be found in archery, Mr. Akers states that the development of character and certain spiritual values are the *raison d'etre* of any art, rather than mere aptitude and skill. This is especially the case with the sport of archery. The real question is not how successful or how skillful you are – nor even whether you actually hit the target – but what *you* personally get out of the game from a spiritual point of view. Correct aim is therefore of the greatest importance and, for this, concentration and a mind as tranquil as the "surface of a still pond" are essential. Mr. Akers draws the parallel of watching a snowflake falling and keeping one's eyes fixed on it until it finally drifts to the

ground. The essence of the art lies in the "unintentional involuntary release" which succeeds the actual release of the arrow. All preliminaries of stance, preparation, posture, raising the bow, drawing and holding, and release lead up to this – the *gathering into one* of the whole shooting posture through stretching. The author maintains that it is then that the *art* reaches its highest point. The archer's body feels invigorated and his mind is clear. He appears "grave and dignified." Such a thought, the book states, is said to leave a lingering resonance behind – and this is really the very highest point of attainment in archery.

Archery is a sport that gives uplift to one's soul and relaxation to one's nerves. It teaches patience, preciseness, and coordination. It is equally satisfactory as a group or as an individual sport. Those with the skills can make their own bows and arrows, bowstrings, and other supplies. It can be made easy and simple by shooting at short ranges, and more challenging at the longer distances. It can be enjoyed both indoors and outdoors. With proper supervision and well-emphasized safety rules, it can be a sport which an individual may learn at school or camp and benefit from throughout his life; he will associate with others who also love fresh air, vigorous walking, and quiet concentration. It has been a boon to many physically handicapped people –paralytics, amputees, etc. It is even a good spectator sport. However, to enjoy archery to the full, skilled instruction is essential. Once an individual is familiar with the arrow and really tries to improve, his enthusiasm and interest will sustain him through all the years that follow.

As I have indicated, archery has a very ancient history, and, as a sport, has always had many adherents. We believe that, today, there are over 500,000 people interested in the use of the bow. Some use it as a hunting weapon; others to shoot at targets on public playgrounds, in colleges, schools, and camps. There are groups of archers that specialize in various aspects of the sport – some who spend their lifetime seeking to cast an arrow great distances; some who enjoy field archery – shooting at simulated objects over a cross-country course; some who are expert at clout shooting, roving, archery golf; and others who construct the bows and arrows themselves. Archery should appeal to everyone. Its value for young people has been recognized by the Boy Scouts, who have instituted a merit badge for proficiency in the sport; and, also, by the Camp Archery Association, which has awarded almost 200,000 diplomas to boys and girls at camps scattered throughout the United States, since it was founded 20 years ago. The National Archery Association sponsors the Olympic Bowman League, which conducts competitions on indoor ranges during the winter months, and sponsors an annual Intercollegiate Telegraphic Tournament for the archers on

college campuses. During the war years, the National Archery Association conducted mail matches in which over 1,000 archers participated. In almost every state there are archery clubs with memberships varying in size from a few to over 100 members. The membership of the National Field Archery Association has greatly expanded during the past 10 years, and 500 to 600 attend their annual national tournaments. Interest in the sport has grown rapidly and steadily. We have seen an interest in the teaching and practicing of archers in schools and in the junior branches of local archery clubs. Some of these youngsters have gone on into competition with those in the senior divisions of the sport and have made excellent records for themselves, but, more important, it has given them a lifetime hobby! There is an ever-increasing need for trained leaders, for physical education directors with a knowledge of archery, and for teachers in camps, colleges, and schools who are accredited archery instructors. Are You?

Ageless Archery

BEVERLY GOSSELIN LEE
Columbus, Ohio

Bows and arrows were one of man's first attempts to store energy. The use of the bow is without question one of the big factors that gave man the place he occupies in today's world. Primitive man used bows as weapons for hunting and protection, and empires were won and lost through their use. They now provide the instrument for one of America's fastest growing sports.

The historical aspects of the sport make an excellent introductory or rainy day archery lesson, and this aspect of the sport should not be overlooked. To be interesting, however, these lessons must be dynamic, up-to-date, and visually stimulating. Charts and posters bring out the highlights of the growth of archery through the ages. They are useful as a basis for a lecture or are easily adapted to bulletin board displays.

From well-preserved cave drawings of archers found in Spain to the development of archery as one of America's most highly regarded current sports, the bow has been found to exist in every country except Australia. Dividing the world roughly into two sections, two great systems of bow construction have developed. The first bows were probably of wood and of simple construction, a form that has persisted with Europeans and most savage tribes. This longbow was native to the Western world and reached its culmination in medieval England. The composite or "built-up" type of bow, another ancient kind, is still used in Asia, and in many respects is the most efficient and perfect type ever devised. Made of wood, horn, and sinew, it was short and powerful and was so highly reflexed that it took the shape of a letter C when it was unstrung. It is the classic bow of antiquity, the bow of Cupid.

These two systems can be historically illustrated by the highly respected archery skill of the Turks and their efficiency in war against the Crusaders, and the equally effective techniques of the English yeomen in the Hundred Years War battles of Crecy, Poitiers, and Agincourt. In these battles, the bow reached its height as a war weapon. The perfection of firearms, however, led to the obsolescence of the bow and arrow as a weapon of war, and so it came into vogue as a sporting pastime. As such, it has continued through various phases to the present day.

The history of archery in the United States begins with the American Indian. He was the aboriginal archer of this continent, using the bow daily in his search for food and in warfare as one of

his chief weapons. However, the skill and prowess of the Indian as an archer have been greatly exaggerated. While the Indian was a marvelously good hunter and, therefore, a practical archer, he was not a good shot with the bow from the standpoint of target shooting. His stalking skill enabled him to get so close to his prey that he could shoot at very short range with almost certain effect.

The first American archery society was the United Bowmen of Philadelphia, founded in 1828. It was not until after the Civil War that the sport became popularized, however, through the efforts of two ex-Confederate soldiers, Maurice and Will Thompson. They moved to the Florida Everglades and lived for several years almost entirely by the bow, and in 1878, Maurice published what has become an American archery classic, the *Witchery of Archery*. Its impact was immediate, and all over the country people began shooting with the bow for sport. Following this, the National Archery Association was organized with Maurice Thompson as its first president.

By the early part of this century, the sport was again beginning to fade from public interest when a curious event occurred in California. In 1911, a naked, starving Indian named Ishi was discovered. He was a living example of a Stone Age man, the last of the Yanas. Saxton Pope realised the significance of this Indian, and through the joint efforts of these two men the most complete and authoritative materials on the archery traditions and techniques of the American Indian were brought to light and preserved. This, in addition to the African adventures of Dr. Pope and Art Young, and the scholarly efforts of many-times national champion Robert Elmer, again stimulated public imagination.

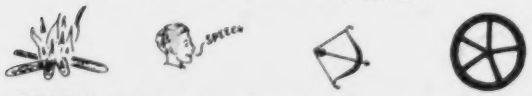
A large part of archery's current growth is due to field archery and hunting. The enthusiasm for these activities led to the formation of the National Field Archery Association in 1939. Since then most states have recognized the bow hunter and the establishment of bow hunting areas.

In recent years the bow has been used in other fields. In the U.S. Army, Special Forces units stationed abroad have organized civilians into effective guerrilla units using the bow as one weapon. The development of the crossbow as a silent kill weapon in Vietnam has become vital. Power companies use it for stringing wire in remote country; wildlife biologists and game technicans use special drug-tipped arrows to capture animals for study or restocking in different areas.

The universal appeal of the sport as a family affair and the rapid developments in equipment have made today's archers a far cry from the English bowmen at Agincourt, but modern bowmen and bowwomen are experts in the old, old field.

Ageless Archery

CULTURAL ADVANCES IN THE HISTORY OF MANKIND



ORIGIN REVEALED BY PALEOLITHIC MAN

Cave drawings – France, Spain
Cro-magnon man – 30,000 - 40,000 yrs. ago
Chipped flint arrow-heads
Aurignacian race – Southern France – 25,000 yrs. ago
Archeological findings

DEVELOPED ON EVERY CONTINENT

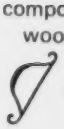
Israelites	Babylonians	Persians	Turks	Europeans	Australians
Egyptians	Assyrians	Greeks Romans	Orientals	American Indian	question

USES OF THE BOW & ARROW

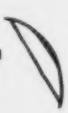
AS A HUNTING WEAPON

AS A WAR WEAPON

ASIA
composite - short reflex
wood - horn - sinew



Turks ⟶ Crusaders ⟶ English yeomen
mounted warriors — foot soldiers



EUROPE & WESTERN WORLD
simple - longbow
yew wood

EUROPEAN WAR TRIUMPHS WITH BOW

1066 Hastings – Normans defeat English
longbow introduced to English as weapon
13140-1453 Hundred Years War –English defeat French
(crecy, poitiers, agincourt) using longbow
1588 Invasion of Spanish Armada – in England
firearms replace bow as major weapon

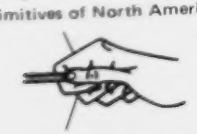
AS A SPORT & ART

Achieved when bow & arrow displaced by gunpowder as weapon
Henry VIII & George IV greatly influence & establish archery as a sport in England.
Roger Ascham — father of archery — published Toxophilus 1545
Formation of English archery societies

1538	Fraternity of St. George
1585	Honorable Artillery Company
1658	Finsbury Archers
1676	Royal Company of Archers, Scotland
1781	Royal Toxophilite Society

VARIATIONS OF STRING-HAND IN DRAW

PINCH
Primary position
thumb & index finger
pinch nock
primitives of North America



THUMB
Mongolian position
thumb wrapped
around string
Asia - Persia, China

FINGER
Mediterranean position
2, 3 or 4 fingers on
string
Europe

ARCHERY IN NORTH AMERICA
EQUIPMENT CONTRASTS

BOW TYPES

Compound
northwest central
Mixed
sinew & plain
plains states & westward
Plain
east coast, south, mexico

FEATHER STYLES

WHOLE whole feather inserted down middle

Aborigines of
Pacific Northwest
New Mexico
Northern Canada
Alaska

SPLIT 3 half feathers

Majority of
North America

in use today

Equipment

Elementary Care and Repair of Archery Tackle

GRACE ROBERTSON
East Northfield, Massachusetts

A good archery program means good equipment. Just as you would not mount a student on an unknown horse or permit her to dive into water of unknown depth so, too, no student can be permitted to shoot without safe tackle in her hands. In addition to the element of safety there is the matter of the student's success and, thus, her continuing interest in the sport; this also depends on her having good equipment.

Equal in importance to the selection of tackle is its care. With proper treatment and small repair projects carried on at school, the life of archery equipment can be considerably lengthened and the cost of the archery program decreased by a sizable amount. One of the best ways to insure good care for your equipment is to foster in your students a respect for their tackle. Secure their cooperation in checking equipment as they shoot and in handling it properly before, during, and after class.

Caring for archery equipment takes time, but it is time well spent in terms of dividends paid to your program. An interested student can sometimes assist with the necessary repair work, receiving – when school regulations permit it – remuneration for her work. Often, too, a rainy day will supply the needed time and manpower for fixing equipment.

This article is designed to present only the basic elements of archery crafts – only those things which can easily be accomplished in a busy school schedule. Included are suggestions for making some of the accessories which are needed, and general hints for cutting down the expense of your program.

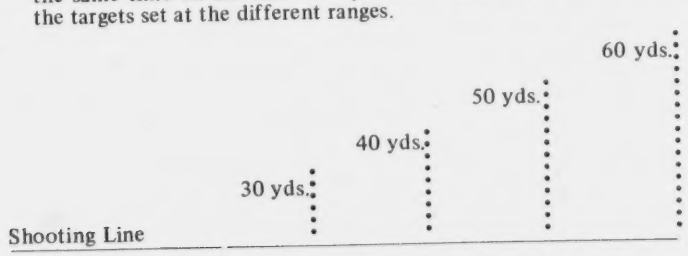
Tackle House

1. The tackle house should be adjacent to the range so that equipment does not have to be carried long distances.
2. The tackle house should be locked at all times when the instructor is not present.

3. It should be large enough to permit students to get out and put away their equipment quickly and efficiently.
4. Storage space for bows and arrows, shelf space, a worktable for repairs, and electricity should be provided.
5. Bulletin board space is desirable.

Range

1. The range should be located away from the main area of the campus. It should be level, grassy, free from rocks, and not used for any other activities (so that targets do not have to be moved.) A bunker behind the targets is most helpful; otherwise, there should be at least 20 yards clearance behind the farthest target. Grass should be mowed often to prevent the loss of arrows which *snake* in.
2. The range should be completely roped off. Warning signs should be used.
3. For an indoor range, all exits and entrances should be locked while shooting is in progress, and danger signs placed on the outside of these doors.
4. Targets should be placed so that their centers are 10 feet apart.
5. When different ranges are required for a group that is shooting at the same time on the same field, use one shooting line and have the targets set at the different ranges.



A SAFE FIELD SET-UP IF DIFFERENT RANGES ARE SHOT AT ONE TIME ON ONE FIELD

6. Targets should be set so that the center of the gold is 4 feet above the ground. They should be tilted back so that a plumb line dropped 6 inches out from the center of the gold just clears the bottom of the target.
7. Targets should always be staked down so that they will not blow over with arrows in them. Indoors, target legs should be placed on rubber stoppers to prevent them from slipping.

Targets

1. Rye straw targets are the most satisfactory, although bales of hay or cardboard boxes stuffed with straw or hay may be substituted. Practically new and greatly reduced targets can be purchased following many archery tournaments, especially after the sectional and national events.
2. Targets should always be carried and never rolled. If left outdoors, they should be covered with waterproof material when not in use. Tarpaulins are excellent for this purpose. Targets will last longer if they are not moved around constantly, even if this means that they have to be left in the open.
3. Targets should be laid out flat to be stored, and should be kept off the floor. Powdered sulphur spread among the butts will help to keep animals away. Targets should be perfectly dry if they are to be stored for any length of time.
4. If the target becomes loose, wetting down with a hose may help to tighten it. This will also help a very dry target which has been stored for a considerable period. Targets may also be tightened by using a coathanger or similar device, starting at the center and pulling each coil of the rope tight.
5. If you use corrugated cardboard targets, a coating with paraffin will increase their life.
6. Target stands should be made of a soft wood, such as pine, to prevent arrow breakage.
7. If target faces begin to go in the center, newspaper and cardboard can be placed behind them, and gum paper can be used to hold the centers together. The newspaper and cardboard may be placed behind the face when it is new.
8. Wind flags (triangular pieces of material mounted on soft pine stocks) do much to add to the attractiveness of a range.
9. If staples are used to fasten target faces, great care should be taken to see that they are not dropped on the range where they may be stepped on.

Bows

1. Bows should always be unbraced when not in use. In bracing and unbracing, equal stress should be placed on the upper and lower limbs so that the bow does not break. To brace a bow: place the lower nock against the instep of the left foot with the back of the bow facing the archer; put the left hand on the bow handle and the heel of the right hand at the top of the bow; pulling with the left hand, pushing with the right hand, and

twisting the body away from the bow, use the free fingers of the right hand to slide the upper loop of the string into the upper nock. To unbrace, repeat the same process, this time sliding the string down from the upper nock.

2. Bows should be hung vertically on wooden pegs, the peg coming between the string and the belly of the bow. If bows are stored horizontally with the pegs near the center of the bow, they should be hung back down. If the pegs are near the ends of the bow, they should be placed belly down.
3. Bows should be stored in a cool, humid place.
4. To help the instructor and to insure that the student has the same bow each time, bows should be numbered, with corresponding numbers placed by each peg.
5. Bows should be re-weighed every season. An ice scale is used for this purpose. The handle of the bow should be placed in the hook at the bottom of the scale. Using an 18 inch arrow for 4 foot bows, a 22 inch arrow for 5 foot bows, or a 26 inch arrow for 5½ foot bows, draw the string back to full draw, noting the reading on the scale. For rapid figuring, approximately one pound may be added or subtracted for every inch more or less the bow is drawn.
6. Arrows painted on the belly of the bow above the handle will enable the instructor to see at a glance if any bow is being shot upside down and will also be of help to the students.
7. Bows should be waxed once a year to protect the finish (wooden bows). Simonize or Johnson's furniture or floor wax is adequate. Glass bows do not need this care. Any leather handles should be saddle soaped.
8. Bows which have cracked or slivered in any way should be broken and thrown away.
9. Strings should be waxed weekly with beeswax. Servings can be treated with paraffin. Any frayed strings should be replaced immediately.
10. Check fistmeles weekly. If a fistmele becomes too low, remove the string from the upper end of the bow and twist it under tension, turning in the direction which will shorten the string.
11. Single loop strings should be tied at the lower nock with a timber hitch.
12. An extra supply of strings should be kept on hand. Single loops are the best because they will fit any bow of approximately the same length.
13. Making your own strings is probably the biggest single budget-cutting item. The cost of a homemade string is approximately one-sixth the cost of a purchased string. The most inexpensive and durable material for string making is Barbour's No. 12 Irish

Linen. Dacron is slightly more expensive but excellent. Any heavy button and carpet thread can be used for the serving. Flemish twist strings may be used on straight bows; however, recurved bows require endless strings, or those which have reinforced loops. Again, the button and carpet thread can be used for this purpose.

Arrows

1. Arrows should be stored in a vertical position in a rack, never left in boxes. A simple arrow tray may be made by taking three boards, drilling holes (in sets of six) through two of these, and then nailing them one above the other, about 8 inches apart, to two uprights. The plain board should be on the bottom. The holes should be large enough for the arrows to fit through but not so large that they have much leeway.
2. Arrows should be stored in a cool, humid place.
3. Each set of 6 arrows should be numbered and have a specific place in the arrow tray.
4. All arrows should have plastic nocks and metal piles so that they can be replaced. Also, it is helpful if all the arrows are the same diameter. Only one size of nocks and piles is needed for replacements in this instance.
5. Having arrows of the same length, all crested alike, will facilitate replacements.
6. Arrows should be checked constantly for broken nocks and piles, and splinters. Any arrow which is cracked or splintered in any way should be broken in two and discarded.
7. All new arrows should be checked for excess glue deposits at the base of each of the feathers. These will scratch the students' hands when the arrow is released. The deposits can be removed with fine sandpaper.
8. Arrows should be waxed once a year to protect the finish. Simonize or Johnson's furniture or floor wax is adequate. When arrows are to be stored over a long period of time (such as a summer vacation), mothballs should be sprinkled among the feathers.
9. Damaged plastic nocks may be removed by burning or scraping. If they are burned, care should be taken that the feathers do not catch fire. Duco cement can be used to hold the new nocks in place. The new nocks should be flush with the shaft of the arrow and the nocks themselves at right angles to the cock feather. Arrows with self nocks which break cannot be repaired.
10. Splintered piles must be broken off. If the pile has telescoped into the arrow shaft, the arrow should be cut above the tele-

scoping and a shorter arrow made. In this case, the pile end will have to be whittled down so that the metal tip will fit the shaft. Piles can most easily be put on with Ferrule-tite cement.

11. Very slight telescoping of the pile can be smoothed down with sandpaper.
12. Slightly warped arrows may be straightened. The most satisfactory results are obtained when the arrow is first heated over a steam kettle. The arrow should be held in one hand with the bend placed against the base of the thumb. Gentle pressure may then be applied to the end of the arrow with the free hand until the bend is straightened.
13. Damaged feathers should be removed from the arrow with a knife, care being taken not to cut into the shaft. New feathers, cut to size, can be put on with Duco cement. Straight pins can be used to hold the feather in place until the glue dries. Since all feathers on an arrow should come from the same wing of the turkey, single wing feathers should be purchased.
14. Crests may be repainted with quick-drying enamel. Old paint should be removed before the new crest is applied.

Arm Guards

1. Plastic arm guards should be washed off with warm water and soap.
2. Leather arm guards should be saddle soaped and the inside surface cleaned. Particular care should be taken of arm guards if there is any type of skin infection among the student body.

Finger Tabs

1. Finger tabs should be made of a smooth, tough leather; cordovan is the best. They may be made quite easily and inexpensively. Be sure to include left-handed tabs for left-handed shooters.
2. Tabs should be saddle soaped regularly to keep them soft.

Quivers

1. Leather belt quivers should be given the same care as any leather equipment: saddle soaping, etc.
2. Ground quivers can be made. Heavy wire can be shaped into a circle at the upper end of a stake which will penetrate the ground. Tennis ball cans with stakes driven through the bottom make good quivers. For indoor use, these same tennis cans with sand in

the bottom for a weight may be used or they may be nailed to a square wooden board which will support them. These quivers may also serve as bow racks when the students retrieve their arrows.

Bow Racks

1. Since all equipment must be kept off the ground to prevent warping from dampness and breakage from being stepped on, bow racks are essential. A wooden pole with a stake in the bottom and dowels driven through the top serve the purpose adequately. A coat rack may be used indoors. Painting with waterproof enamel will increase the life of the bow racks and add to the appearance of the range.

Scorecards

1. Scorecards can be duplicated or mimeographed.

First Aid Equipment

1. Tincture of benzoin for toughening the skin on the fingers should always be available and used as soon as fingers show the slightest degree of soreness.
2. Bandaids, moleskin, antiseptics, and scissors should also be kept on the range.

Bow Sights

1. Inexpensive and simple sights can be made by placing adhesive tape on the back of the upper limb of the bow and using a large-headed pin for sighting, the pin being placed through the adhesive tape at the correct distance above the handle.
2. More elaborate sights can be purchased. These include hair and bead sights, and prisms.

Tassels

1. Tassels made from yarn should be used to wipe off arrows which have missed the target.
2. They make attractive prizes for archery contests and can be used within classes to stimulate interest and reward progress. For example: have white, black, blue, red, and gold tassels; when a student achieves a certain score she receives a higher color tassel.

Care and Repair of Tackle

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In reading this article on the care and repair of tackle please remember that it is practical and follows procedures usable for schools and clubs with limited facilities. It makes no claim to methods to be used in commercial projects. Any equipment to be used for extremely accurate competitive shooting should be commercially made and reconditioned.

Storage Of Equipment

Bows: Bows should be hung up by their unbraced strings on pegs made of short dowels. The storage space should be cool and ordinarily humid. Hot or dry rooms tend to make bows brittle and will thus shorten their useful life. Bows left standing on end tend to weaken in the lower limb or take a set. *Never* store a bow in *any* position *braced*.

Arrows: Arrows should be stored in a rack so that they stand on their points. Racks should be made with holes so that the shafts slide into the holes without binding, and so that all of the feathers miss match. The top hole should be placed low enough to clear the feathers and the crest. Again, a cool and normally humid room is best. Arrows stored lying down will tend to bend from their own weight if left any length of time.

Simple Repairs Of Equipment

Arrows – Replacement of Nocks: Arrows with plastic nocks are most easily repaired. Plastic nocks are readily available from all tackle manufacturers. They are available in standard styles and diameters to fit all commercial arrows. Be sure that the ones you use fit flush with the shaft of the arrow on the outside and have the proper bore to fit the arrow on the inside.

Once you have the proper nock for your arrow, the actual replacement process is as follows: Touch a match to the broken nock, and burn it off, being careful to keep the flame clear of the feathers. (Since the plastic has a lower kindling point than the wood of the arrow, no damage will be done to the shaft, and the flame will put itself out when the plastic is consumed.) If the nock is not readily flammable, it may be gently whittled off with a jackknife. Clean the

surface with sandpaper for gluing. Smear with Duco or airplane cement, and place the new nock in position with the groove of the nock perpendicular to the cock feather. (see Figure 1).

If an arrow with a self wooden nock needs its nock repaired, cut the nock end to fit the internal bore of the plastic nock (using a jackknife or commercial tool similar in plan to a pencil sharpener) and proceed as above. Although an arrow fixed in this manner will not accurately match its fellows with wooden nocks, it will be all right for beginner teaching.

Arrows – Replacement of Points: Points, like nocks, may be purchased readily with all standard internal and external diameters, and of either steel or brass to match the ones already on the arrows. Be sure to match them very accurately to preserve the weight balance of the set, and be sure that the outside diameter of the point is exactly that of the shaft so that the point will not be pulled off when drawing the arrow from the target.

Ferrule cement is easily purchased and is a big help in making the points stay on, although it is not absolutely vital. If Ferrule cement is to be used, heat both the cement and the point over a candle flame. Smear the cement on the point end of the shaft, and while the point is still hot, slip the point into place and hold it there until

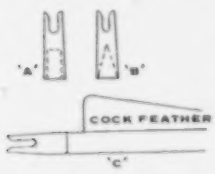

FIGURE 1

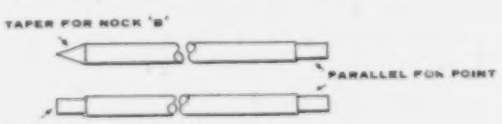

FIGURE 2

FIGURE 3

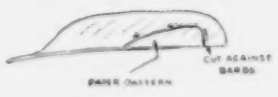

FIGURE 4

cool. When cool, use a prick punch on the point to dent it in three or four *symmetrical* spots to keep it in place. (Symmetry is important to preserve the balance of the arrow.) If a knurler is available – an attachment on the nock cutting tool – its use will make for a more standard and efficient job. (see Figure 2).

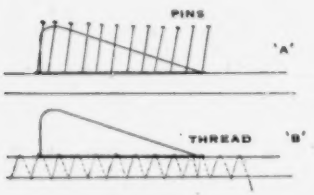

FIGURE 5

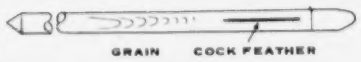

FIGURE 6

One advantage of using Ferrule cement is that if a point becomes loose, a match flame applied to the loose point will remelt the cement so that it will grip the point more tightly.

Fletching: Before we can go into the procedure of replacing feathers, we must study Figure 3, to be sure we know which wing grew the feather. If the feather is off the quill, you will find that one surface of the feather is smoother than the other. The smooth side is the top part of the feather as it grew on the wing. Matching the feathers to those already on the arrows is vitally important to smooth flight of the arrow. Since the feathers are slightly tipped by nature, all of the feathers on the arrow must be from the same wing, and to go even farther, all of the feathers used in one set of arrows must come from the same wing.

Replacement of Feathers

For only one feather missing: Be sure the new feather is from the proper wing, and is of the same general weight and quality. Sketch a paper pattern of the remaining feathers on the arrow, and with a sharp pair of scissors, cut along the pattern against the grain of the feather quills (see Figure 4). If a feather burner is available, do not cut the feather, but glue it in place in any of the following methods, then shape it with the burner.

Gluing methods: Use Duco cement or airplane glue.

1. Pin method. Set the feather by eye so that it lies along the shaft at 120 degrees from the other feathers. Pin the quill surface to

the shaft (as in Figure 5) at frequent intervals, and allow it to dry thoroughly.

2. Thread wrapping. This method is inferior, but it is a shift if necessary. Place the feather as for pinning, then wrap the quill with thread, separating the barbs gently without crushing them, so that the thread goes right to the quill without permanently spreading the barbs (see Figure 5).

3. Feathering jig. Simple feathering jigs are on the market and are well supplied with directions. One hint – when using a jig, lightly grease the metal surfaces with vaseline or cold cream so that the feathers will not stick in the glue. Jigs are more accurate than pins or thread, but if a quantity of arrows must be repaired at one time, the jigs will be slower.

Regardless of the method of gluing used, when the feathers are well glued be sure to sandpaper the quill ends of the feathers so that they taper gently onto the shaft. Any roughness connected with the feathers – glue or quills – tends to cut the archer's hand when the arrow is shot.

For all feathers missing: The above methods are used. Precautions: Be sure the cock feather is at right angles to the groove of the nock. If the nock of the arrow has not yet been put on, look for the predominant grain of the shaft, be sure that it is directed away from the pile, and be sure that the cock feather is in the middle of it (check with Figure 6).

Straightening Arrows: Cut to desired length with a saw or jackknife. If a self arrow, it is most easily shortened from the point end. If footed, the arrow may be shortened from the nock end, though that means stripping the feathers and changing the crest. Follow the procedures for putting on nocks and points.

Stripping Feathers: To prepare feathers for fletching, if the feathers are just as they came off the turkey, be sure that they are wing feathers – those with broad barbs on one side of the quill and small ones on the other. Hold the quill at the top of the feather on the narrow-barbed side. Grasp the wide barbs near the top of the quill and firmly pull on them straight down toward the bottom of the feather. The wide barbs should strip off the quill with only a small edge of the quill covering the inside endge of the barbs. Trim the quill edging with a razor or scissors so that it is just wide enough to pin onto the shaft of the arrow. Cut the feather into pieces a little longer than the sections to be used on the arrow, using only the middle parts of the feather to get the strongest barbs. One average sized feather should cut into two usable sections.

Bows – Repairing a lift of grain: If a weak limb becomes evident, and the cause can be found to be a piece of the grain rising from the rest of the wood, the repair is simple and practical. Smear the rise of

grain on top and bottom with Duco or airplance cement. Wrap tightly through the glue with bow string linen, starting the wrapping at least two inches above the rise and finishing at least two inches below the end of the rise. The wrapping should be done in the same manner mentioned later for serving strings. Since the glue will keep the wrapping in place for the life of the bow, be careful to do a neat job (see Figure 7).

Bow strings: Materials: Barbour's Irish Linen #12 (one strand for each pound of bow weight). Fortisan (strength specified on the spool).

Flemish Twist: There are many types of bow strings to be made, but an easy and very effective one is the Flemish Twist. In this description I shall speak in terms of a 20-pound bow. If a heavier bow is used, merely add enough string to each strand to make up the difference in the weight. Remember to add equal amounts to each strand, as your string is only as strong as its weakest strand.

For the string, measure the length of the bow plus about one foot. Lay thread on thread evenly the length measured until half the bow weight is made up – that is: for a 20-pound bow, lay 10 pounds worth of string into one strand. Wax ends thoroughly by whipping beeswax along threads, and wax lightly in the middle. Be sure that the string is smooth – any loops will weaken the string. Make up a second strand of the same strength.

To twist: Hold the two strands together between thumb and forefinger of the left hand about five inches from one end, with the long ends of the string dangling from the back of the hand. With the right hand, take the strand farthest from you, twist it away from you, and cross it over the other strand toward you. Then take the one away from you, twist it away from you and cross it over the other, toward you. Continue this process until about 12 twist-overs have been completed. Now spread out the short ends and the long ends, and fold the twisted part so that each short end falls on one long one. Now turn the string so that the loop just made is under the thumb, and the ends protrude from the front of your hand. Work the long and short ends as one piece, and twist as above: twist the one farthest from you away from you, and cross it over the one toward you, etc. until you have twisted past the short ones plust about ½ inch. This will make your total twisted portion about four inches in length (see Figure 8).

Place the loop you have just finished over a hook or the nock of the bow, straighten the strands of the string, and by leading one strand between your thumb and forefinger, and the other by the same forefinger and middle finger thumb and forefinger, and the other by the same forefinger and middle finger (see Figure 9), run your hand the length of the string about 12 inches. Be sure to keep

equal tension on each strand, as both pieces must be of exactly the same length. Still holding the strands with tension, pinch the string at a spot about four inches short of the actual length of the bow, so that the short ends protrude from the front of your hand. Now twist again as above until all of the string is used up. Tie a knot in the end of the string, and you are finished. *Before* any tension is applied to the string, roll the string between the thumb and forefinger until there is a definite twist to the whole length of the string in the direction that will tighten the twisted ends. This will remove the back-twist put into the string caused by the making of the loops. Failure to remove this back-twist will ravel the loops when pressure is put on it. This is your single-loop string. The bottom is now tied with the Timberhitch as described below.

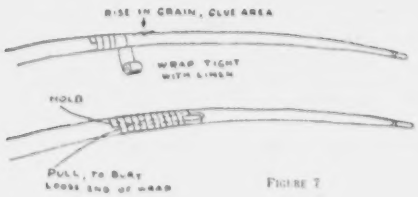

FIGURE 7

FIGURE 8

FIGURE 9

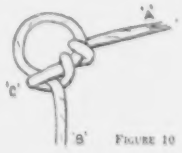

FIGURE 10

If a double loop string is desired, the same procedure is followed, only make your second twist just long enough to make the size loop desired. Then fold the short ends over the long ends, and working one short and one long as a unit, twist until total twist is about five inches, and the short-ends have been used up. Do not forget to remove the back-twist.

Now put the string on the bow, wax it lightly, and with a folded piece of semi-glossy paper or brown wrapping paper – not newsprint – to protect your hand from the heat, rub the string vigorously. Slight pressure will stretch the string. Keep rubbing until the string has stretched to its maximum length. Twist as you did to remove the back-twist until the proper bracing length is attained. Your string is now ready for serving and use.

Timberhitch: Grasp the Flemist Twist at the point the knot is desired with the short end protruding from the front of your hand. Make a half-inch loop by crossing the short end A *over* the long end B at the thumb, C, and bring the short end around under B so that it has encircled B once. Then lead the end A through the loop thus made *from the top down* twice to the right of the crossover (see Figure 10).

Slip this loop over nock of bow and tighten by a tug on the long end. This loop is easily made, will never slip if properly made, yet may be released by pushing against the point of the crossover with the thumbnail.

Serving: Use heavy carpet thread. Perhaps the quickest method of serving is to use a mechanical server which is relatively inexpensive. However, the job may be done equally well without gadgets, although a little more time will be consumed. To serve by hand, a very long piece of thread will be necessary, roughly about six feet. Start at a point about two inches above the top of the handle, and continue until enough of the bow string is covered so that the arm guard will not chafe at any part of the string proper on the release.

Servings are put on with the string braced on its bow. Lay about ½ inch of serving thread on the string so that your first wrapping will cover it (to keep the end from slipping off). Then wrap the string snugly but not too tightly (experience is the only guide) over the starting end and continue toward the bottom of the bow until the desired length of service is desired. Every wind should touch every other one as it would on a spool of thread. When the desired length has been finished, take another piece of the same thread, about eight inches in length, and fold it on itself to make a small loop. Lay this on the serving and continue to wind over it a little less tightly for about seven winds. Then slip the end of the serving thread through the loop just put in, and pull the tails of the loop so that the end of the serving thread is drawn under the last winds. Now pull the end

tightly so that it will tighten up the last winds – it will frequently break at this point – cut it off, and run a little Duco cement on each end of the serving.

Nocking point: The nocking point should be put on the string in the same manner as the serving just described, only its total length should not exceed ½ inch. It should be placed below the nock of the arrow so that the bottom of the nock will touch the top of the nocking point. To measure for the exact placing, it should be directly across from the top of the handle and 1/8 inch above.

Do not be discouraged by the lengthy descriptions involved in these directions. None of these simple crafts is difficult, and none is very time-consuming once the procedures are learned. The care of good archery tackle can be a joy, and it is without a doubt a decided financial asset.

The drawings in this section are by the courtesy of Lincoln B. Smith of Holyoke, Massachusetts.

Bow Designs

PHYLLIS JACOBSON
Brigham Young University
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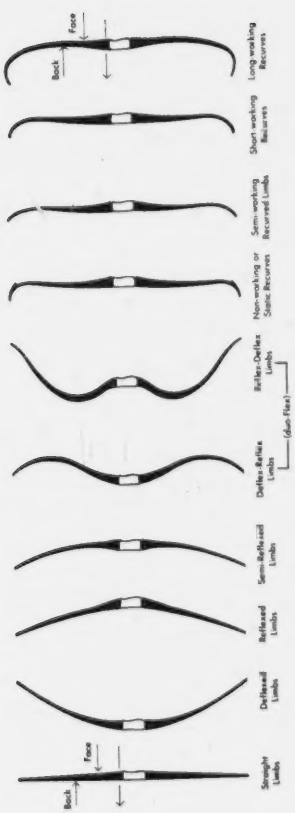

1. Long-working recurves: Smooth, no vibration, not very fast.
2. Short-working recurves: Fairly fast, but not very smooth.
3. Semi-working recurved limbs: Smooth, but not as fast as a static recurve.
4. Static recurves: Fast, rough.
5. Reflex-deflex limbs: Fast, rough; short life.
6. Deflex-reflex limbs: smooth, fast; long life.
7. Semi-reflex limbs: Slower and smoother than reflexed limbs.
8. Reflexed limbs: Fast, but rough; short life.
9. Deflexed limbs: Smooth, but slow; long life.
10. Straight limbs: Easy for beginner to handle, stable, long life, slow in velocity.

Accessories for Archery

G. HOWARD GILLELAN
Former Archery Editor,
Outdoor Life

My hunting companion discovered he had forgotten his shooting glove, the leather covering worn by archers on the hand that pulls the bowstring. We had parked the car a few hundred yards from our deer blinds one October morning at 5 a.m. and were unloading our gear by flashlight when he realized the glove was missing. He cut loose with a string of expletives and wound up asking how stupid he could get.

He knew he had to be able to get off one or two shots without a glove, but he knew also because he was so accustomed to its protection on his fingers, he would very likely flinch or jerk the string when he let an arrow loose. I slipped him the spare glove I usually carry in my hunting jacket. While it was not as snug on his fingers as his own glove, it was better than nothing.

Glove

An archer's glove is simply a few pieces of leather stitched together and held in place on the hand by an adjustable strap. Some bowmen prefer a tab, a flat piece of leather held between the fingers and the drawn string. Most finger tabs are padded with felt, rubber, or extra strips of leather. A hole in the tab, or a small thong, keeps it in position on the bowman's hand.

The main purpose of a glove or tab is to protect the tips of the first three fingers on the hand which pulls back the bowstring. As the bow is drawn, pressure on these fingers builds up. At the moment of release, the rugged bowstring whips across the finger tips causing a tremendous amount of friction.

There's a second reason for the glove or finger tab – a smooth release. To shoot with consistent accuracy, an archer's release – and the other elements which comprise his form – must be uniform on each shot. The bowstring, therefore, should pass over the fingers in an even movement, without jumping, jarring, or digging into the fingers at the joints. The leather finger covering aids in this, because it smooths out the natural roughness of the shooter's fingers.

So gloves or tabs will resist forming a deep groove from the bowstring, many are made with a layer of tough, smooth, shell cordovan leather on the outside. For the same reason, one manufacturer

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makes gloves with thin strips of spring steel between two layers of leather in the fingers. On the more recent models, strips of plastic are used in place of steel.

There are many other refinements, such as elastic inserts in the wrist straps for a tighter fit; a glove with washable, snap-on fingers made of vinyl plastic; a tab with a thick insert between the first two fingers to prevent the string from pinching the fingers; and a glove tab. On this the index finger is enclosed, the other fingers resting on a flat pad. Still another variation uses three individual, plastic finger stalls which come in eight sizes and can be trimmed for a custom fit.

There's also available a pair of sleek buckskin dress gloves for bowmen. They resemble any other pair of matched gloves except that the tips of three fingers on one of the gloves are covered with horsehide.

Heavy bows cause more string friction than light ones, but a dozen or so shots with even a 25-pounder can raise painful welts or blisters on the fingers if the bowstring is unprotected. There are a few thick-skinned individualists who have been successful in developing enough callouses on their fingers so they don't need a glove or tab. However, when they take a long layoff from archery the callouses disappear, and the painful toughening process has to be repeated. Some bowmen who have tried this say there is no pain, but that a good tab or glove provides a smoother release than the bare fingers.

Regardless of which type of finger covering you use, the cost is reasonable. The highest-priced tabs are less than $2, while most shooting gloves are under $3. But don't be misled by the small cost of this accessory. I know a top competitive archer who told me he would sooner change bows in mid-tourney than switch to a strange tab.

Armguard

The armguard – worn on the wrist of the bow arm – is important too. Unlike the glove or tab, though, the armguard has no direct effect on the bowman's shooting. It is secured to the arm with elastic or a thong, and its purpose is to protect the inside of the forearm from the bowstring immediately after the release. A few armguards are plastic, but most are leather reinforced with one or two narrow steel stays.

Some archers, because of the way they hold a bow, don't need the protection of an armguard. Nevertheless, they generally wear one as insurance against a bad release which may cause the heavy bowstring to slap across the wrist and take a layer of skin with it. In

hunting, the armguard can be worn on the outside of the jacket to prevent a loose cuff from interfering with the string's forward motion.

Quiver

The third essential accessory for archers is the quiver, used to hold a supply of arrows in the field. There are dozens of designs, from the simple pocket quiver, which holds only four arrows and fits into the hip pocket, to unique, homemade hunting models from which the bowman draws his shafts out of the underside.

The bowstring, as an indispensable part of the bow, cannot be considered an accessory, but does bear special mention. You should never be without a spare one, even if the string on your bow is new. After a recent experience I had, I'm convinced that carrying two extra bowstrings is a good idea.

I was on a one-week bowfishing trip hundreds of miles from a tackle shop. On the very first morning my bow slipped off the thwart of a small boat and became wedged under the seat so that the string rubbed against the sharp edge of the thwart. I discovered it when only two of the string's 16 strands had been cut, but that was enough to make me put on my other string very quickly.

Do not make the mistake of carrying a spare bowstring that's never been used. You'll need one that's been broken in enough so that the stretch has been shot out of it. Be sure the spare bowstring is well waxed, and carry with you a cake of bowstring wax. This is a special compound which keeps the strands together and lengthens the life of the bowstring.

Nocking Point

Your extra string should be equipped with a nocking point, because there's seldom time to put one on in the field when you are forced to use a fresh bowstring. The nocking point is a small raised spot on the string. It is used to position the arrow in precisely the same place before each shot and to keep the arrow nock from sliding up and down along the string. It can be put on by wrapping the string with thread until a pronounced bump on the bowstring is formed, then securing it with several coats of cement. The bump must be big enough for you to feel, since there are times when you will not want to take your eyes off your game while nocking an arrow. And at night you can put a shaft on your string at the right spot by feeling the bump.

The location of the nocking point on the string is very important, since an arrow will not fly right if it's nocked too high or too low. For best results with most modern bows, the arrow should point slightly downward. In other words, the arrow's nock should be a trifle above center on the string. Place the shaft in position on the bow so it's perpendicular to the string. Mark the string about 1/8 inch above this point to indicate where your arrow should rest, then wrap on your nocking point.

Many archers like to wrap the nocking point on the string above the arrow nock, while just as many prefer it below the nock. Some bowmen use two nocking points – one above and one below the arrow – but one will do. Several manufacturers offer plastic or rubber nocking points which are easily installed and which tend to decrease friction between glove and bowstring.

To reduce friction further, many tournament archers use wax or talcum powder between glove or tab and bowstring. They can be seen almost after every shot either dabbing at a powder dispenser or slapping a special powder-filled pouch at their belts. The ones who prefer wax usually rub paraffin or a silicone treated archers' lubricating wax into the string near the nocking point and into the glove.

Arrow Rest

Almost all ranking tournament archers use some sort of special arrow rest on their bows, again as an aid in smooth shooting. Arrow rests come in at least six different designs. Some of them consist of trimmed feathers, some are thin metal bands, and some are nylon wheels.

Bow Sling

Another accessory which is not new but which has recently been catching on with many serious tournament archers is the bow sling, or thong. Nothing more than a leather strap or rawhide cord securing the bow to the shooter's wrist, the thong allows the bowman to overcome a natural tendency to hold his bow too tightly. A too-tight bow hand is potentially a serious fault for a competitive bowman. With the wrist thong in place, an archer need not squeeze the bow's grip at all. When he releases an arrow, the bow falls from his hand and is caught by the sling.

A sight on a bow may be considered an accessory, but to the free-stylers who use them in competition, and to the many bow hunters who use them on game, the sight is an integral part of the weapon. For that reason, sights will be discussed in the future.

Minor Accessories

There are numerous minor accessories which are as useful to the ordinary arrow slinger as to the hotshot – for example, the bow-tip protector, a small rubber sleeve fitted to the bow's lower limb. It protects the slender tip and holds the lower loop of the string in place before and during the bracing of the bow. For the upper bowstring loop there's a string holder which holds the string against the bow when it's unstrung.

There are plenty of practical gadgets for the hunting bowman, too. If you've ever endured a cramped index finger from carrying your bow at the ready throughout a day's hunting, you may appreciate an arrow holder, an ingenious little device that can be taped or screwed to the bow. Two small rubber pads on a strip of springy steel are arranged so they hold a nocked arrow poised for instant drawing. When the shaft is pulled back for a shot, tension on the arrow holder is relaxed and it drops out of the way.

Another useful accessory is a zippered leather pouch fitted to the bow's lower limb with adjustable elastic bands. Called a bow-pac, it's handy for carrying such items as bowstring, wax, matches, and compass when you're in the field without a jacket full of pockets or shooting without a shoulder quiver and its storage pocket. Most dealers carry a belt pouch for the same purpose.

There's one invaluable aid for bowhunters on a hunting or camping trip in extremely flat or rocky country. In terrain of this kind it's often impossible to find a hillside or steep bank to serve as a target backstop. But if the archers are equipped with a mat, this problem will be solved. The tightly woven mats come in four sizes, from 16 to 48 inches.

Bowstring silencers, to reduce the twang of the string, as well as brush buttons to prevent twigs and branches from hanging up in the bow's tips are important to bowhunters. The well-equipped archer on the game trail should have a good file for sharpening his broadheads.

The rest of the bowhunter's kit is about the same as any experienced hunter's. Some things are optional, such as camera, sunglasses, adhesive tape, fly dope, handwarmer, folding seat, and seat pad. Some are at one time or another indispensable: knife, rope, compass, flashlight, matches, and first aid kit.

"Best Buy" Ratings in Archery Equipment

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This article is intended to provide information and to counsel the instructor on matters relating to the purchase of good archery equipment. Nine items which directly affect the shooting proficiency of the archer have been selected for evaluation. They are: bows, bowstrings, bow tip protectors, nocking points, bowsights, arrows, arrow rests, armguards, and finger tabs.

Bows

Bow weight: A bow must be light enough for the person using it. The archer should be able to pull the bow to full draw without excessive effort or strain over a prolonged period of shooting.

Bow weight is determined by the number of pounds of force needed to pull the bow the length of an arrow. Most bows are weighed at a 28-inch draw. This means that the bow is weighed in at the amount of force needed to pull a 28-inch arrow back so that the tip of the arrow is touching the back of the bow. The ratio of pounds to inches is approximately two pounds to the inch.

For target shooting, the bow weight recommended for women is 20 to 30 pounds. A 25-pound bow weighed at a 28-inch draw is recommended for the average college woman. High school girls should use bows that weigh 20 pounds at 26 inches.

The beginner should start with a bow weight that is too light. Then as shooting technique is mastered, a heavier bow can be used. For Novice archers, especially women and children, a bow of 15 to 25 pounds is suggested.

Bow length: Bows for adults are made in lengths from 52 inches to 72 inches. Bows 58 inches long are considered acceptable. Those of 60 inches to 66 inches in length last longer and cause less pinching of the fingers as the string is drawn. The longer bow also facilitates the release.

Bow designs: There are two fundamental bow designs. The straight bow is the easier to build and therefore usually less expensive. The recurved bow, on the other hand, ranks superior in all-around performance. The recurves, acting as levers on each end of the bow,

increase the arrow speed. The recurve also acts as a shock absorber as the bow straightens. Contrary to common belief, the recurve does not prevent "stacking," the rapid increase of weight found in the last few inches of draw. Good tillering does this.

"Working recurve" is a common term used in advertising. This means that the curved bow tip bends as the bow is drawn. Actually this characteristic is true of practically every modern recurved bow. The recurve is effective only when the bowstring touches and rests two to four inches on the bow limb.

The lemonwood, hickory, osage, and yew bows have been replaced by better materials. Today almost all bows are made of fiberglass. Solid fiberglass bows are usually machine made, and, as a consequence, sell for less money than laminated bows. They lack speed and ease, however, in handling.

The best bows are now fiberglass laminations or layers over a hardwood (maple) core. The laminated fiberglass is far superior to the solid fiberglass bow. It shoots faster, has less shock in the release, and is physically lighter in weight.

Arrow rests, sight windows, centershot design: Most bows come with an arrow shelf cut into the bow. However, many of the best bows are made with an arrow shelf that is too large for accurate shooting. Consequently, it is strongly recommended that all bows should be fitted with an arrow rest. The better bows are also designed with a sight window to allow a good view of the target.

Nearly all modern recurve bows are built with a centershot design. The arrow, as a result, is shot straighter; it does not have to bend as much around the bow.

Bowstrings

Bowstrings may all look alike, but they differ in many ways. Not only do they vary in length but also in composition, cast, strength, and stretch. The ideal string provides even tension on every strand. The stress is evenly distributed so that every thread does its share of work. The number of strands recommended is in proportion to bow poundage. Handmade bowstrings composed of dacron strands and nylon servings furnish greater life.

Bow weight, the bow style and model, and bow length must be considered when purchasing a bowstring. When the bow length is unknown, it can be ascertained by measuring from nock to nock along the bow back. The double loop string is all right, but seldom fits properly unless it is made especially for the bow model. A single loop bowstring will not fit all bows. The serving of a single loop bowstring must fall within the nocking point area. When a single

loop bowstring is attached, the tie at the lower bow nock must be a timberhitch knot.

Bow tip protectors

A piece of rubber or plastic shaped to cover the bow tip is called a bow tip protector. It prevents scuffing or breakage of the bow tip and holds the bowstring in place while stringing or while placed in storage. Made of vinyl plastic or pliable rubber, bow tip protectors fit most bows.

The do-it-yourself bow tip protector consists of a small rubberband, one inch long and one-quarter inch wide. The rubberband is twisted in a manner that it will hold the bowstring in the bow nocks. The only purpose this serves is to keep the string in place.

Nocking points

The nocking point is that area that accepts the nock (plastic) of the arrow. This bowstring attachment increases accuracy by helping the archer to hook the arrow at the same spot for each shot. The angle above the arrow should not be less than a 90 degree angle. It also allows for a smoother, faster release. A nocking point should fit snugly on the bowstring so that an arrow can be nocked in the proper place instantly and remain nocked until released. Some nocking points are designed to eliminate the necessity of a shooting tab or glove.

The do-it-yourself nocking point is made by folding a six inch piece of dental tape at the midway point. The fold is placed around the bowstring slightly above the nocking point area. The two ends of the dental tape are wrapped in opposite directions, closely and evenly around the bowstring. A square knot is tied upon reaching the end. This inexpensive technique provides an adequate nocking point.

Bowsights

The use of a bowsight is an acceptable and effective method of aiming. Accuracy in aiming from fixed distances can be developed more quickly with a bowsight than with any other aiming method. The sight is usually attached to the back of the bow just above the handle. It should be easily mountable and firmly attached. The ideal bowsight is one which can be adjusted for both elevation and wind-

age, with the assurance that while one adjustment is being made (e.g., elevation), the other (e.g., windage) will remain firmly in place.

The do-it-yourself bowsight is an acceptable aiming device. The construction necessitates only a piece of adhesive tape one-half inch to one-inch wide and a one inch long pin with a small black head. The adhesive tape is placed on the back of the bow just above the handle. The pin is inserted between the bow and tape so that the head projects from the left of the bow (for a right-hander) at the correct distance above the handle. Although some championship tournaments have been won with the use of homemade bowsights, they are primarily used in large instruction classes in schools, camps, and playgrounds.

Arrows

Arrows are generally classified into two groups: the matched and the unmatched. "Matched" means that a set of arrows are of the same spine (stiffness of the arrow shaft) and physical weight. In addition, the arrow length, shaft diameter, feather size, crest, nock, point, etc. are also alike. Although "unmatched" arrows may look alike, they will not all possess the same qualities in stiffness and weight.

The spine of the arrow is the most important factor in choosing quality arrows. Keep in mind that there is a particular spine of shaft for each different bow weight. As the bow weight increases, so does the pressure the string exerts on the arrow. Consequently, the arrow must be spined to resist this pressure and to keep the arrow from bending too far. The second consideration is the physical weight of the arrow. The trajectory of an arrow that is too heavy is slow and inaccurate.

Accurate shooting demands the use of quality "matched" arrows. Buy the best arrows your budget can afford. Select with care. Most manufacturers state on the box the bow weight for which the arrows are suitable.

Most wooden arrows are made of Port Orford cedar which is generally grown in Oregon and is regarded as the finest wood for arrow making. Cedar arrows are sometimes recommended for beginners, but wooden arrows are not considered top quality because changes in temperature and humidity can warp them. They are easily broken and gradually wear out because of the softening of the wood with continuous use.

Fiberglass is becoming popular as a quality arrow shaft. It is almost indestructible and remains relatively straight. Fiberglass arrows are available in a variety of weights and shaft sizes to fit every

need and bow weight. Now tubular glass arrows compare favorably with aluminum in lightness and flatness of trajectory and are considered more durable than aluminum.

Aluminum arrows have for years been considered the top quality. Because of their cost, however, aluminum arrows are not recommended where arrow loss is common, nor where arrows which miss the target will hit other hard surfaces, causing bending of the shafts. These are not arrows for beginners but they do assure maximum accuracy for serious archers.

Arrow rests

The use of an arrow rest, a projection placed on the side of the bow, results in a greater degree of accuracy in shooting. This accessory holds the arrow at the exact spot each time the archer shoots. The angle formed above the arrow and bowstring should not be less than 90 degrees when the arrow is placed on the arrow rest and nocked at its nocking point. The beginner finds it a useful device in that it eliminates discomfort to the bow hand which sometimes results from the arrow or fletchings as the arrow is released.

The arrow rest should be easily mountable and nonmovable. It should be large enough to accommodate arrows of various sizes. Vanes and feathers should clear the arrow rest with no crest or feather damage. A "disappearing" type is preferable. Some arrow rests are specifically for either left- or right-handed bows, while others are interchangeable.

A do-it-yourself arrow rest can be made from a ½" X ½" X 2" eraser. Simply cut the eraser in half so that the cut edge will serve as a shelf for the arrow. Mount the cut eraser by gluing it onto the side of the bow.

Armguards

When the bow is held properly, the bowstring will occasionally strike the forearm. An armguard eliminates discomfort of the bow arm. Armguards are made of plastic or leather. Better armguards are made of cordovan, a glossy leather, and are lined with soft leather. They are reinforced with a strip or strips of steel running the entire length to keep them flat and to absorb some of the shock. Those with adjustable elastic strap attachments are recommended; the laced style are bulky and inconvenient to put on.

Experienced archers always wear armguards; inexperienced archers are advised to adopt the practice.

A tongue depressor strapped onto the bow arm with either adhesive tape or rubberbands equips the bow arm of an archer adequately, if proper shooting style is displayed.

Finger Tabs

A finger tab precludes discomfort to the archer's finger tips. A tab is also preferred by most archers because of its faster release. Finger tabs are made of cowhide, cordovan with leather or felt backing, or leather backing faced with hair-calf. Small, medium, large, and extra large tabs are available for either left or right hands.

Shooting gloves are not recommended. An inexperienced archer is more apt to pinch the arrow when wearing a shooting glove.

The two piece cordovan faced shooting tab can be purchased with either a leather or felt backing. It has only one opening for the shooting fingers.

Facts - Bows and Arrows

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Straight Bow

The straight bow is the simplest and least complex of the bow family. The limbs are essentially straight, although some curvature is built into a few models, from the handle to the tips. The string is held in place on the bowtips by means of grooves cut into the wood called bow nocks. The thickened section in the center of the bow is the handle riser. When the bow is strung and held in the hand ready for shooting, the part of the limb facing the archer is called the belly or facing. The part of the limb facing away from the archer is called the back.

Because of the irregularities of various bow woods from which most straight limbed bows are made, the old straight bow has a tendency to be more erratic in its shooting characteristics than the modern bow made of fiberglass and maple laminations. The straight bow is the slowest of all types of bows; that is, it has the least cast or velocity. To produce satisfactory trajectories for either target shooting or hunting, straight bows must be heavier in weight or pull than its modern counterpart, the composite recurve. The distance from the arrow rest to the string is called the fistmele.

Composite Recurve

The composite recurve, or working recurve, is exactly what its name implies. The bow limb of the recurve differs greatly from the straight bow. Its limb leaves the handle riser curving slightly towards the shooter and then recurves away from the shooter towards the tip. Simply stated, the ends or tips of the recurve bow curve away from the archer in varying degrees when held in normal shooting position.

When the recurve end unwinds when drawn, the bow limb is cocked for extra work. The recurve acts as a lever on the end of each limb, increasing arrow speed by as much as 20 percent and acting as a shock absorber to reduce jar to a minimum. It also greatly increases the smoothness of the draw and eliminates stacking, the rapid increase of weight during the last few inches of draw.

Parts of the Bow

The handle section of the bow is formed in three parts: the grip, riser, and overdraw. The *handle riser* covers the entire unbending section of the center of the bow. The *overdraw* is that part of the bow which overlaps your hand. The *grip* is the part held in the hand and is usually contoured to give a comfortable fit which will position itself the same way every time you hold the bow. Most bows are furnished with a standard pistol grip design. Some of the custom bows are made with a special high wrist grip which is more deeply contoured to give additional support.

The *arrow rest* is designed to support the arrow, keep it away from the shooter's hand, and position it the same with each shot. All bows, except very inexpensive ones, are factory equipped with an arrow rest. Many of the best bows of laminated fiberglass are made with very large arrow rests which also serve as torsion stabilizers.

The *sight window* is the cutaway section of the riser through which the arrow passes. All of the better bows are designed with sight windows, which greatly aid in having a good view of the target. Sight windows must be cut for either right- or left-hand shooting.

The term *centershot* indicates that the bow has been cut almost to the center axis of the bow at the point where the arrow passes. By removing the wood, the arrow does not have to bend as much around the bow as it would otherwise and therefore shoots straighter, even when a shooting mistake is made. Practically every modern quality bow is made as a centershot.

Materials Used in Bow Construction

Today almost every quality bow uses fiberglass in its construction, as this material gives more speed, is more lightweight, far greater life than any material previously used. The best bows are made of thin fiberglass sheets laminated over a maple core. This type of construction is far superior to a solid fiberglass construction as it will shoot faster, have less jar, and be physically lighter. However, solid fiberglass bows can be machine produced and therefore sell for much less than the composite types, which are strictly handcrafted instruments.

Lemonwood and hickory are still used for inexpensive bows. They will not give the performance of either solid or laminated fiberglass and are not recommended for serious shooting.

Aluminum is used for crossbows and a few inexpensive youngsters' bows. Serious accidents have resulted due to their breakage and they should not be used for regular shooting.

Laminated fiberglass bows are by far the best investment when purchasing a bow. They give much longer life, better performance, and higher trade-ins later on.

Arrow

Contrary to the usual idea of the uninitiated that a good bow will shoot almost any arrow, the arrow is really the most vital part of an archer's equipment. Practically any old bent stick, (*practically*, that is) with a string tied on it will shoot an arrow with reasonable accuracy if the arrow is straight, balanced, and properly matched to the bow. The best bow made cannot shoot a poorly matched arrow properly or make a crooked arrow fly straight. The word *spine* refers to the stiffness of the arrow shaft. The higher the drawing weight of the bow, the stiffer the shaft must be to shoot properly. The correct match of arrow spine and bow weight is absolutely necessary to make an arrow go where you aim it. If the arrow is too limber for the weight of the bow, the arrow will fly to the right of the target. If it is too stiff, it will fly to the left. It is not only frustrating but impossible to try for precision shooting with arrows that are not matched in spine. Never shoot an odd assortment of arrows. When buying arrows, the weight of the bow and your draw length should always be considered.

Arrow Construction

A wide variety of materials are used in making arrows. The simple little arrow is really a very complex missile. The following description of arrow materials will give you an idea of the extremely varied selection of arrows available.

Port Orford cedar grown in Oregon is regarded as the finest wood for arrows because it is light weight, extremely straight grained, and uniform In spine. Most arrows are made of this material. Wood, however, has many drawbacks, making it unsuitable for top quality arrows. It warps easily from changes in termperature and humidity, is heavier than other arrow materials, breaks easily, and gradually wears out. It is ideal for throw-away and hunting arrows for the archer with a limited budget. A guide used by all archers, however, is always buy the best arrows your budget can afford. Wood arrows are a last resort.

Fiberglass has rapidly become the most popular quality arrow shaft for general use. It is virtually indestructible, cannot be bent out of shape or straightness, and is available in a wide selection of

weights and sizes to fit every need and bow weight. In the past, the major drawback to fiberglass was its heavy weight. Developments during the last few years, however, have produced glass shafts that are nearly as light as aluminum. Fiberglass arrows are beyond doubt the very best for beginning archers.

Aluminum shafts have long been the choice of champions. Machine testing has proved that the finest accuracy is possible only with aluminum arrows. When you consider that almost every state, regional, national, and international tournament has been won by archers using aluminum arrows for more than 15 years, the fact is hard to argue. Aluminum arrows are not for beginners, they are expensive compared to wood.

Fletching

Fletching guides and stabilizes your arrow from the time it leaves your bow until it hits the target. Although fletching can be somewhat involved, there is nothing mysterious about its use.

The size of the fletching determines how fast your arrow returns to a straight flight after bending around the bow. With a light target arrow a smaller feather is used than with a heavy broadhead hunting arrow. The shape of the feather determines the guiding properties and noise of the arrow during flight.

Fletching consists of either plastic or turkey feathers. The small hard "Plasti-Fletch" is used where maximum arrow speed and highest accuracy are desired. Arrows fletched with "Plasti-Fletch" are most often used for serious tournament shooting and are not recommended for beginning archers.

Selection and Care of Equipment

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Here is a summary of a questionnaire which was sent to 38 commercial companies to obtain information about aiding archery teachers in the selection and care of modern archery equipment.

Bows

1. *Can soiled fiberglass bows be washed with a detergent?*
   Some respondents answered yes, providing the laminate is a sound one and the detergent is mild. Others prefer cleaning the bow with a good wax.
2. *Should fiberglass bows be hung, stood, or placed across a rack? Is one method better than another?*
   Many respondents stated any of these methods is satisfactory; a few indicated a preference of either hanging or resting the bow across the rack with no weight resting on it.
3. *Does dampness or dryness affect these bows in storage areas?*
   Many manufacturers indicated dampness or dryness in storage cabinets had no effect on fiberglass bows. A few indicated extremes of either condition were not good. Storage in a cool, well ventilated, and not too dry place was recommended.
4. *Does rain or sun affect fiberglass bows?*
   The majority of respondents felt the life of a bow could be affected by hot sun, but not by rain. Several cautioned archers not to leave strung bows in closed cars in sunlight. Bows should be wiped off after use in rain. The bow should be allowed to adjust to the temperature of its surroundings (when being moved from extreme cold or heat) before use.
5. *Will a bow be damaged by keeping it strung longer than the shooting period?*
   Consensus is that it should not be strung indefinitely. The bow might "take a set." Bows are dangerous when a string breaks. Composite bows are strung all day in hunting, but should be unstrung when not in use.
6. *Do you suggest keeping a new bow strung overnight to make it easier to handle?*
   Most respondents answered no.
7. *Is length important in the selection of a fiberglass bow?*
   Many respondents said "yes." For target archery, the longer bow is

considered better because it is easier to draw, reduces jar, and is more accurate. Many recommended at least a 60-inch bow as the most practical for schools and colleges.

8. *Does the recurve bow have more advantages in target archery?*
   Most manufacturers felt the recurve bow was faster and more accurate, and had a flatter trajectory and less recoil. A few felt the straight limb bow was best for beginners and for those who shot infrequently.
9. *What other suggestions were given for bows?*
   Crooked or damaged bows whould be checked for safety. A bow that is within the strength of the shooter should be used. Acquaintance with modern archery equipment is essential. A bonafide manufacturer who guarantees his equipment should be selected.

Strings

1. *Should nylon strings be waxed? What is the best wax to use?*
   All strings should be waxed to prevent foreign materials from getting in the strand and causing abrasion and wear. Beeswax was the most frequently recommended wax, but some manufacturers indicate any good commerical brand is satisfactory.
2. *Can strings be shortened by knotting without harming effective shooting?*
   Strings should never be knotted. Twisting a string in the direction of the manufactured twist will shorten it a small amount. Use the right length or a single loop string which can be adjusted.
3. *Should string keepers be removed?*
   If they are on the bow limb itself and interfere with the action of the string, they should be removed.
4. *What other suggestions were given for strings?*
   For string length, measure bows from back of one bow neck to back of other bow neck. Nocking points should be marked on string to help shooter nock arrow properly. Always twist string in same direction of serving twist. Dacron rather than nylon strings were recommended. Proper length of string without excessive twisting should be used. Be certain strings have proper brace height and nocking markers.

Arrows

1. *How can wooden arrows be cleaned?*
   Several manufacturers recommended rubbing lightly with fine steel wool; then apply Bowcare. Others suggested any good floor cleanser or wax.

2. *What glue do you recommend for feathers and nocks?*
   Duro household cement or Everfast were the most frequently mentioned glues for wooden arrows. Pliobond by Goodyear Tire and Rubber Co. was mentioned most frequently for use on glass and aluminum arrows.
3. *Can warped arrows be straightened in a vise?*
   No. The following suggestions were given to straighten arrows: sight down the arrow and press hard; heat arrow at warped spot, hold arrow between forefinger and thumb, bend it slightly more than warp, and hold arrow in this position until cool. Throw arrow away if warp is too bad.
4. *What precautions should be taken to keep arrows from warping?*
   Store by standing on end in racks; avoid crowding and side pressures. Avoid excessive heat, cold, or dampness, and check often for splits and cracks.
5. *What other suggestions were given for arrows?*
   Many manufacturers recommended fiberglass arrows be purchased instead of wooden arrows. Although the initial cost is high, fiberglass arrows last longer and give better performance. Aluminum arrows are recommended for competitive target shooting.

Leather Armguards and Finger Tabs

1. *How can perspiration stains be removed?*
   Washing with good detergent or saddle soap helps, but all stains cannot be removed.
2. *How can stiff new armguards and finger tabs be made more pliable?*
   Most respondents replied "through usage." Some suggested buying pliable ones. Others suggested soaking them in water, rubbing them with saddle soap, vaseline, Bowcare, Lexol, or neats'-foot oil.
3. *What can be done to make them last longer?*
   Buy good quality leather ones. Keep them out of rain, treat them with oil before using, and store them in plastic bag away from heat or moisture.
4. *What other suggestions were given for armguards and finger tabs?*
   Use elastic guards rather than ones thar are laced. Get good tabs in small and medium sizes. Gloves are preferred to tabs for beginners. Take full first joint hold on string, not finger tip grip, because few shooters have enough strength to hold. Put a little talcum powder on tab face to make it smoother and for a crisper release.

Targets

1. *How should targets be stored when not in use?*
   In a moderately humid, cool place, and face down.
2. *What can be done to keep mice away from targets?*
   Best targets are chemically treated for mouse-proofing. Some suggest spraying targets with antifreeze, solution of sal soda, or putting paradichlorobenzene lumps or crystals on targets. Store in mouse-proof place.
3. *What cover is recommended for targets left outside during a season?*
   Any waterproof material, such as plastic, oilcloth, or canvas.
4. *What other suggestions were given for targets?*
   They should be carried, never rolled. Tighten them up each year. Dampen targets with a spray mist in dry weather.

How to Start and End the Serving on a Bowstring

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This article describes the mechanics of beginning and ending a serving. When preparing to serve a bowstring you must determine that portion of the string where protection is needed. The bow must first be braced and then the upper and lower limits of the desired serving area must be marked with pen or pencil.

Pull six to eight inches of nylon serving thread off the serving tool or spool. At the top end of the area to be served, separate the strands of the bowstring into two equal parts and insert about one inch of the serving thread between the strands. Lay the one inch of serving thread along the bowstring so that it is *within* the areas to be served (Figure 1-A). Hand wrap the serving thread (Figure 1-B) *over* this one inch length, continuing for five or six turns, to anchor it in place. The rest of the serving can now be completed with the serving tool, or by hand if no tool is being used.

When the serving covers the proper area, as indicated by the marks on the bowstring, cut the thread from the serving tool or spool, leaving about 12 inches of excess. Make a turn, as if you were going to wrap the thread around the string again, but leave a loop (Figure 2-A). Come up *inside* this loop and wrap around the bowstring five or six times *in the direction of the area already served* (Figure 2-B). Then lay the last three or four inches of the serving thread on top of the served area (Figure 2-C) and anchor it there with your thumb and forefinger (Figure 3-A).

With your other hand, wrap the serving thread around the bowstring, making these wraps a continuation of the area already served (Figure 3-B). As these turns are made, you will be unwrapping the five or six loops you made around the bowstring in Figure 2. When the last of these loops is unwrapped, take hold of the end of the serving thread that has been anchored under your thumb and forefinger (Figure 3-A) and pull the excess thread through. With a sharp razor blade, carefully cut the excess serving thread off close to the serving. Apply a light coat of glue to the first and last eight turns of the serving around the bowstring.

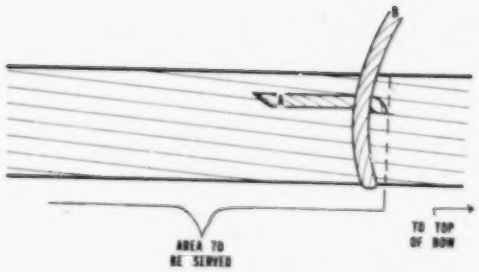

Figure 1

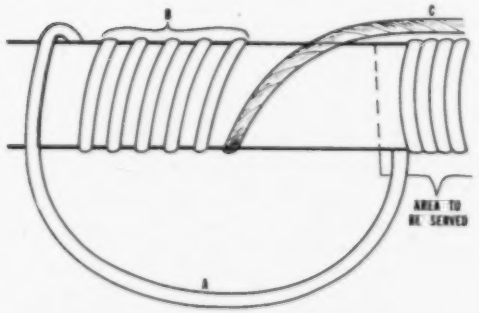

Figure 2

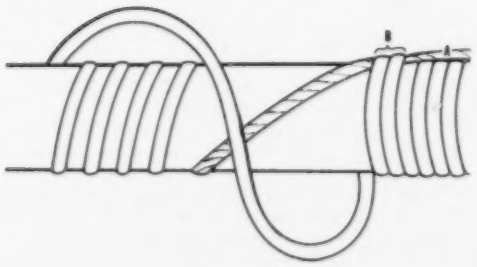

Figure 3

Instruction

Safety Rules

MYRTLE K. MILLER
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Safety practices in archery cannot be overemphasized. All campers and students, archery counselors and teachers should study and observe the safety rules presented here before they put bows and arrows to use in any camp or school program.

For the Archer

1. A nocked arrow (one that is placed on a bowstring) is like a loaded gun. A bow drawn with an arrow nocked is like a loaded gun cocked and ready to shoot. Be as thoughtful and careful when using a bow and arrow as you would be using a gun with ammunition.
2. Never nock an arrow until after the signal is given to shoot. Keep arrow in quiver until signal is given to shoot.
3. Stay behind the shooting line until the signal is given to retrieve arrows, when all archers will go at one time to retrieve.
4. Straddle the shooting line to be sure that every member of the class is directly behind the one in front of her.
5. Feel a definite responsiblity for the safety of every member of the class, as well as for yourself.
6. Shoot only if you are equipped with an armguard and finger tab or shooting glove. These are as necessary as bows and arrows to engage in archery safely and successfully. All archers use armguards and finger tabs. Wear an armguard and finger protection every time you release an arrow. The armgruard protects your forearm from the slap of the bowstring and the finger tab keeps your fingers from being burned and blistered. (Tabs also help to get a smoother release which helps you get more hits.)
7. Wear clothing which has no pockets, buttons, or ruffles on the left to interfere with the bowstring upon release. A tee shirt or sweater is ideal.
8. Remove pins or buttons from the left of a sweater or blouse during shooting to avoid catching the bowstring on them.
9. Always keep in mind how powerful a bow is. An arrow released from even a medium-weight bow can put a hole through a piece of metal. Keep in mind the extreme seriousness of an accident if a person were hit by a released arrow.

10. Make it your duty to point out to each student the importance of constant safety consciousness on the archery range. Be alert to notice the slightest offense and remind the offender before she has a chance to cause an accident.

11. Remember that any part of the range, in front of the shooting line, even at the extreme right or left, is forbidden territory until the signal is given to retrieve arrows.

12. An archery range is not a safe terrain for bare feet. Wear good walking shoes.

Use of Arrows

1. Nock the arrow with the cock feather pointing away from the bow, not toward it.

2. Check net arrows for glue deposits, especially on the side feather to the left of the cock feather which passes over the top of the bow band. If there is any roughness at the base of this feather, it will scratch the hand as the arrow is released. The excess glue can be rubbed off with fine sandpaper. If a scratch appears on the top of the hand, all arrows should be checked before being shot again. A Bandaid should be placed on the scratch before shooting is continued.

3. Be sure arrows are long enough, especially for beginning archers, to prevent overdrawing the arrow and causing serious injuries.

4. Carry arrows near the point, never near the nock end. (It is unnecessary, however, to place a finger between each arrow while holding it in the hand.)

5. Draw arrows from the target one person at a time, while the others stand at the side of the target. The arrow is drawn by placing the left hand on the target face and placing the right thumb and forefinger as near the point of the arrow as possible. The arrow is then pulled straight out, keeping the angle at which it entered the target. The drawn arrow is placed in the left hand with the crest end down, while the next arrow is drawn carefully.

6. After retreiving the arrows, place them in the quiver – never on the ground.

7. Pick up low arrows that have missed the target as soon as they are discovered, taking care to touch them as near the point end as possible. (This usually will mean your fingers are touching the grass when you begin to draw the arrow from the ground.) Again the arrow is drawn straight out at the angle it entered the ground.

8. Wipe off arrows that miss the target with a woolen tassel (worn on the belt quiver for this purpose) before they are shot again. This will protect the bow as well as the arrow.

9. Inspect arrows for cracks or breaks in the shaft (a great menace to safety) and break in two any that are questionable. The only way you can be sure they will not be shot and possibly go through someone's hand is to dispose of them.

10. If an arrow has hit a hard object so that the point has been pushed into the shaft, be sure it is filed down and rubbed with sandpaper until it is smooth and then waxed before it is shot again. Watch for any arrows that may have this splintering at the point end; if such an arrow is shot before being repaired, the splintering will follow up the shaft when it enters the target and the arrow will be ruined. Also, there is danger in getting slivers in the hand on the release.

Use of the Bow

1. Never draw a bow without an arrow in it, as it may be overdrawn and cause the bow to break or the string to slip from the fingers and break the bow.

2. Never draw a bow, even without an arrow in it, while someone is in front of it. The bow may break and the pieces fly forward with force that would cause injuries.

3. While bracing a bow, keep the fingers from getting between the string and the bow at the upper end. Keep the hand firmly placed, palm down on the top of the bow, keeping that arm straight until you are certain the loop is definitely in the upper nock of the bow before removing the hand. If the loop of the string slipped out of the nock, the bow would snap back, hitting the archer in the head.

4. Hang bows on bow racks or place them on ground quivers made for bows as well as arrows. No part of the bow should ever touch the ground, as the dampness removes the cast from the bow and there is also danger of the bow being stepped on.

5. Check the fistmele (distance from belly of bow to string when braced) to be sure it is six inches. If it is less than this, the string will slap your wrist.

6. Brace the bow correctly, applying pressure only where it should be applied.

7. Unbrace the bow when you have finished shooting.

Technique

1. Avoid injuring left arm at the elbow by paying careful attention to correct position of the left arm at full draw.

2. Avoid bruising left shoulder by using a very light bow and training both shoulders to move down and back on the draw, instead of hunching the left shoulder.

3. Armguards and finger protection are "musts." Tender fingers may require tincture of benzoin to toughen the skin. Apply before fingers become sore.

4. Keep bowstring close to the left arm on the draw so that at full draw the string comes close to the armpit.

5. Keep forefinger of the bow hand around the bow grip, with the thumb on top of it, to avoid possibility of injuring the finger or making the arrow fly high.

For Counselors or Instructors

1. Know all of the above safety rules and be sure your students know them and their complete meaning. Emphasize the most important ones before shooting begins; during shooting, return to them, studying them more in detail and making constant reference to their being used.

2. Set up the archery range, and organize and plan your archery program and procedures so that all possible causes for accidents are removed.

3. Conduct supervised practices at all times. Have every student begin to shoot on a signal and retrieve on a signal on all targets.

4. Make every student and archer "safety conscious." Bows and arrows are weapons. Remember this when you put them into the hands of students.

5. There is no safe place in front of the shooting line. Although arrows glance off to the left more frequently than they do to the right, they can accidentally glance off in either direction. The only safe place is behind the shooting line.

6. Insist upon armguard and finger tab. It is better for a camper or student not to shoot at all than to shoot without armguard and tab, as only discouragement can result.

7. Check on what each student is wearing to be sure there is nothing in the path of the bowstring on the release.

8. Demonstrate the penetrating power of an arrow by shooting one into a soft piece of pine wood placed on the target.

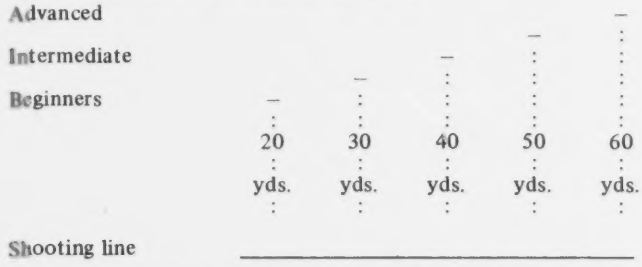
9. Make each camper responsible for her own safety practices and those of the archer in front of her on the shooting line. This is the only way to insure safety, since the instructor cannot watch every member of the class every minute.

10. Caution students about arrows that drop from the bowstring. These should be reached with the bow and pulled back of the shoot-

ing line. Caution them about reaching over the line to pick up an arrow, particularly beginners, who do this frequently.

Target Archery Range

1. When different ranges are required for a group that is shooting at the same time on the same field, use one common shooting line and have the targets set as shown in the sketch.



2. Check all doors on an indoor range and possible entrances to the range, especially between the shooting line and the targets and behind the targets. Have doors locked. Avoid any possibility of passersby going behind the targets, even at a distance, or trespassing between the shooting line and targets. Outdoors, have at least 20 or 30 yards of clearing behind the targets, if possible.
3. Have ropes surrounding the archery range.
4. Bow racks and quivers, points of aim, and toe markers should be available, as well as tassels to encourage students to take care of the tackle. Helping students individually to place their points of aim correctly can make for more hits and less danger to the arrows.
5. Make each student feel she is an important part of an archery safety committee so that she feels a definite responsibility for the safety of others as well as for herself.
6. A safe archery program can be conducted only if an instructor or counselor knows the subject thoroughly. To attempt to teach without adequate training and experience is an unsafe practice in itself.

Field Archery Range

1. All the above rules apply on the field course. Different locations may require special rules. Be sure to become familiar with

these before shooting on a course for the first time. Abide by all local rules.

2. Release an arrow *only* if you can see clearly your target *and* area beyond.

3. Advance beyond shooting position only *after* signal has been given to go.

4. If shooting is not supervised, call "timber" *before* drawing the bow, to make sure the complete area is clear.

5. Before going behind target to retrieve missing arrows, have one of the group remain in front of the target to be sure the other archers hold their shooting. If you are shooting alone, tie a "flag" to the top limb of your bow and stand it against the target in clear sight of other archers. The bow alone is not sufficiently conspicuous.

6. Help your archery companions and spectators learn about safe archery practices. You may save a life and it could be your own!

7. Protect the wildlife and natural beauties of the course as well as yourself, your fellow archers, and spectators.

For Bowhunters

1. Safety to other hunters, to oneself, to livestock, and to property must be uppermost in every bowhunter's mind – at all times.

2. Keep hunting arrows in quiver while going to your stand or leaving it.

3. Keep a safe distance from your hunting companion while walking through rugged terrain to avoid injury from arrowheads in case she stumbles or falls.

4. Mark each arrow clearly with your name and address.

5. A good hunter must be a good archer, a good conservationist, and above all, a good sportsman. It takes *practice* and form to be a *good archer.*

6. Endeavor to correct any unsafe act by a thoughless or perhaps uninformed hunter you may witness.

7. Wear safe hunting clothes with respect to style and color.

8. Check locally all legal requirements and rules of the area *before* you go hunting.

9. Take map, compass, and first aid kit with you.

10. Be aware of other hunting parties nearby. Know their locations and movements.

Intermediate Archery Instruction

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What is an "intermediate archer?" Should a student be considered in this bracket simply because she has completed a class in beginning archery? Or does the term "intermediate" imply that the student has learned well the techniques of target shooting and is ready to move into new experiences in archery?

Students generally enroll in intermediate archery with varying degrees of skill and experience. Approximately half of the students have completed a beginning archery class. Most display average skill, but they are eager to become better archers. It is not unusual to have several very fine archers and a slightly greater number of poorly skilled archers. One of the main objectives of all the students taking the course is to either learn target shooting techniques or to utilize the class period as a practice period to "sharpen" the arrow for the deer season. Many hunters enroll in the class with mimimum basic knowledge and skills of target shooting.

Target Shooting

To accommodate this variance in skills and experiences, the first unit of the course covers target shooting. After the initial introduction with emphasis on safety and basic skills, the students practice as a class group the seven fundamental skills – stance, nocking, drawing, anchor point, aim, release, and follow-through. The procedure is repeated several times with emphasis on particular fundamentals where needed. A person-to-person check is made as students continue to practice at their own pace. All of this work is done in the gymnasium rather than on the field, to better utilize the time which would be lost in moving from the gymnasium to the field and back. About eight periods are devoted to this unit.

Approximately two weeks are spent on target shooting. During this time, individual coaching is given. However, the student is encouraged to analyze her own errors through the kinesthetic perception principle. On occasion, when a student has been having difficulty, she is asked to deliberately assume the incorrect technique as well as the correct one. In most instances, the student is then able to recognize where the troubles lies and how to correct it. This procedure is essential for a student to progress.

It is physically impossible for the instructor to observe each student as much as she would like during classes. Intricate deviations in skills are likely to occur from class period to class period, possibly even from end to end. Secondly, kinesthetic perception is important in archery if the sport is to be continued as recreation. At this stage, the student is not able to take advantage of the instructor's experience in detecting skill deviation. Hence, if she is to make constructive scores and, consequently, continue through archery with success and satisfaction, she must learn to be her own coach.

Most target shooting is done from 40- and 50-yard ranges. Minimum shooting is done from 20- and 60-yard ranges, the latter because of limitations of the shooting area. Individual scoring seems sufficient to keep students motivated. However, to add variety to the class, balloons are placed on the targets for several class periods. Students will discover that breaking a balloon is more challenging than simply hitting the scoring area.

Clout Shooting

During one or two periods of the course, the class usually goes to the football field for an experience in clout shooting. The football field is selected because the space is much greater. Targets are set up at both ends of the field so that more time can be spent in shooting.

Field Archery

The third unit of intermediate archery is conducted in a forested area where a simulated course for field archery is set up.

At the first class meeting, when the course outline is presented, the announcement is made that each of them will be responsible for preparing a target for the field archery experience. Sometime during the second week of the course, the students indicate to the instructor the animals they have choosen to make. A maximum of nine targets is made, since it has been discovered that students rarely get around to more than nine targets in one class period. Students work together in small groups to prepare the targets. Those students who do not make targets assume more responsibility in setting up the course.

The only instructions given to the students are: (a) the official size of the bull and spot, (b) the size of the animal, and (c) the materials to be used. Students are advised to make the animals life-sized, with the exception of pheasants, squirrels, and rabbits, in which cases a slightly larger than life-size is needed. Cardboard is

suggested for the material and crayon or paint other than watercolors is recommended because the targets are exposed to adverse weather conditions.

The Target Area

After a discussion of important factors in setting up a target course, the class goes out to the area to survey its possibilities for setting up targets at varying ranges and for use of the terrain to include a variety of shots. The students are asked to keep in mind safety when three or four groups are moving about and the placement of targets to minimize possible loss of arrows. Students who are free the period before the archery period set up the bales of hay, slip the targets under the binding cord, and tie on larger targets with additional string.

White markers are driven into the ground so that the number of each post and the number of shots to be taken at each one can be clearly seen. White arrows are placed on trees so that the archers are aware of the easiest route to the next post. Generally, the setting up of the course takes one class period with all students assisting.

The transition from target archery to field archery is initiated when the students move from the archery range to the wooded area. At this point, six basic techniques which differ from those of target archery are introduced to the students. These are (a) the feet are slightly farther apart than for target archery, (b) the anchor point is high on the cheek, (c) the head is tilted, (d) the bow is slightly inclined, (e) both eyes are open for aiming, and (f) the arrow is released a fraction of a second earlier than in target archery. Students first practice without equipment; then they practice with equipment, but do not release the arrow. Finally, they shoot at the target. Moving slowly step by step in this fashion enables the instructor to check individual variances in technique.

Field shooting experiences are the highlights of the course for intermediate archers. They are able to enjoy hunting with one distinct advantage – their game is waiting to be shot.

A Moving Target

However challenged students may be with the simplified version of field shooting, they welcome the opportunity to try their skill at a moving target. A moving target can be improvised by placing several layers of cardboard in the center of an old tire. Suspend the tire by a rope from a sturdy branch of a tree. The tire can then be

moved back and forth by means of a second rope tied to the side of the tree. In this way the operator is able to control the rotary movement of the tire. As a safety factor, the operator stays behind a barrier or has enough rope to be well out of the range of the arrow paths.

Students are taught the technique of shooting at a moving target by observing the path of the swinging tire and anticipating the length of time it takes the tire to swing in an arc. The interval of time existing between the time the arrow is released and its contact with the target is comparable to a ball player throwing a ball and a running teammate catching it, or the hunter shooting a gun and the time between the trigger pull and the downing of the bird. Through these comparisons, the students are able to comprehend the necessity of aiming ahead of the target – just how far is a matter of trial and error.

There are many other ways in which an intermediate course in archery for college students might be made interesting and challenging. One could include archery golf, roving archery, and shooting at animals on a moving track.

Advanced Archery

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Official reports reveal that archery in 1955 was the fastest growing sport in the schools. Statistics also show that the sale of archery tackle was near the top in a survey made of sports equipment sales. This phenomenal growth creates an increased demand upon physical educators to have archery practiced in a safe, sane and successful way. Articles in *DGWS Guides* have given readers ways of presenting the sport, basic techniques, etc., but it is necessary for the physical educator also to furnish aids to improve even the advanced archer.

As in any other sport, the higher the rung reached on the ladder of achievement, the more difficult and challenging is the task of improving. The human machine, of course, never really attains complete perfection, which makes us realize there is always work to be done, regardless of the degree of proficiency in any skill. It takes considerable practice and concentration on form to have an archer improve his, let us say, American Round score from 300 points to 400; it takes greater effort to improve to a 500 point round. To approach a score of 600 calls for still more attention to the fine points of shooting, but to approach the 700 point "realm" now required to be in the top brackets in national competition, the archer may have few flaws or inconsistencies in his complete shooting form.

By the time the student has reached the advanced level he will be shooting Columbia Round scores around 450–500 pretty consistently. By the time he has reached this point, his conscientious practice of seven steps of shooting (*Archery-Riding Guide*, June 1954–June 1956) has become a pretty fixed pattern, the stand, nock and primary draw hardly needs further concentration. However, to improve he must concentrate more diligently on these three steps . . . *Aim* . . . *Secondary draw* . . . *Release* (or *Loose*).

The primary draw is merely the physical means of drawing the bow string back to bring the nock of the arrow to a definite anchor or spot on each shot. This is the first part of the aiming step because it actually *aims* the back end (or *nock*) of the arrow. The primary draw is a pushing and pulling action, bringing into use the upper arm, shoulder, and back muscles–the forearm, hand, and fingers of the drawing hand should be completely free from tension.

The advanced archer no longer needs to concentrate on the primary draw. The *aim* is his first point of concentration. The anchor is comparable to the back sight on a gun–but, on a gun it is a mechanical thing–in shooting a bow, the back sight is established by the human "machine" in the anchor. In target archery, the most popular anchor is that of placing the forefinger under the jawbone with the string touching the middle of the chin and the tip of the nose. For field archery or bow hunting a higher anchor is usually used, with the forefinger placed just under the cheekbone. Thus, whether aiming instinctively or with a sight, the arrow point can be seen nearer the object to be hit. In field archery, the distance and size of the targets vary in practically every shot and speed is often necessary. This higher anchor for field archery and bowhunting must also be consistent–the same on every shot. The same care in all of the other points in technique must also be applied for successful field shooting and bowhunting.

Aiming the point of the arrow is extremely important. Accuracy in aiming is a must for good scores. Whether the archer uses the sight method of aiming or point of aim, the point of the arrow must be accurately aimed at a very definite spot. If *POA* is used it is not enough to see arrow point on the *POA* . . . it should be seen in a definite position with respect to the *POA*, preferably the whole *POA* sitting on the tip of the arrow. If a sight is used, the sight must be seen not just on the gold, but at an exact spot on the gold. Perhaps seeing the "bead" at the top of the gold would be more accurate for an individual than seeing it in the center of the 9½ inch gold. The aim must be identical on every shot. High scores cannot be made without careful aiming. Few archers actually aim with as great accuracy as is possible. Aiming is done at the most difficult part of the shot and it is easy to be careless about it, but to be an advanced archer the aim must be accurate.

One more point the advanced archer must consider during the aiming step is string alignment. Assuming the head is held in correct position and the bow is vertical, the bowstring should be seen lined up so near the center of the bow that no space or window is seen between the bow and the bowstring at full draw. If it is more definite for the individual to see the string aligned directly along the left side of the bow, this sight picture is satisfactory. The important thing is that the individual archer sees exactly the same sight picture on each shot. He should see the bowstring aligned in the same place on each shot with no space between the string and the bow. The string will appear blurred due to the closeness of the focal point to the eye.

The next point of concentration for the advanced archer is the *secondary draw*. The purpose of this secondary draw is to keep the

arrow back at full draw throughout the aiming or holding step until the release takes place. This is possible only through the conscious use of the upper back muscles. To keep the arrow back at full draw the shoulders are slowly moving backward and the shoulder blades are approaching each other. These upper back muscles actually will be "opposing" the weight of the bow being drawn, and unless this muscular energy is greater than the energy in the bow being used, the arrow will creep forward before the release takes place. If this happens, it is obvious the pressure behind this arrow will not be as great as it would have been had the arrow been released while at full draw.

It is assumed, of course, that the archer has the correct length arrow for his individual draw. Let us suppose an archer draws a 25 inch arrow. If his bow is 22 pounds at 25 inches and he releases the arrow when it is drawn the full 25 inches, he will have 22 pounds of force behind that arrow, sending it to the target. However, if in his secondary draw he allows his back muscles to become lazy and the arrow has crept forward during the aiming or holding step, there may be only 18 to 20 pounds of pressure behind that arrow. Assuming the point of the arrow is aimed at the same mark, and all other things being equal, this arrow will obviously fly lower that the one that was sent to the target with the full 22 pounds of energy behind it.

This secondary draw calls for a very high degree of neuromuscular control and is one point the archer must concentrate on regardless of how advanced he may be. The muscular action in this secondary draw is a slow concentration of the upper back muscles which increases the shoulder spread just enough to keep the arrow at full draw during the aiming process.

A mechanical draw check is often used on a bow to help the archer know when the arrow is completely back. However, nature will supply a draw check if we watch for the appearance of a thin line of flesh that will appear between the point of aim and the point of the arrow. If a sight is used, this natural draw check will appear just above the point of the arrow. Using the draw check on each shot will result in accuracy in the height of each shot since it controls the pressure or force behind each arrow as it is sent to the target.

The third point of concentration for the advanced archer is the *release*, or *loose*. When the archer is certain the arrow is accurately aimed and at full draw position, he will experience a feeling of "readiness" to let the string slip from his fingers. The release is not a muscular action, but rather a reaction to the muscular action which has taken place during the aiming step and secondary draw. The archer at this point just lets the fingers relax to enable the string to slip smoothly from them. The less interference from the archer on

the release, the better the release will be. The right hand and elbow should move back alongside of the neck in the release; the shoulder blades move toward each other until nature stops the action. The amount of "spread" in the release depends upon the anatomical construction of the individual archer, particularly in the upper back. With most individuals this reaction movement stops when the right hand falls just about below the ear.

Relaxation is also the secret to a good left hand loose. The wrist, hand, and fingers of the bow hand relax at the same instant the string leaves the fingers of the drawing hand, and the bow is allowed to do what it wants to do. However, the archer must guide the direction and make sure that perfect alignment is kept directly with the center of the gold. The bow hand moves slightly forward toward the target in the release because the bow arm has been putting some pressure into the bow at full draw. Any movement of the bow arm right or left, or any pressure on the bow grip on the right or left sides of the bow will make the arrows fly right or left. Alignment with the center of the gold is all-important from the very beginning to the end of the complete shot. The bow arm must also maintain the same level held at full draw; allowing the bow arm to move up or down would cause the arrows to fly high or low.

It takes diligent coaching on the part of the instructor, and conscientious practice on the part of the student to reach the level of an advanced archer. However, the satisfaction derived from attaining this achievement makes the effort worthwhile. Archery, through its own merits attained a greater growth than any other sport in the schools in 1955. Statistics in the sports world reveal that in the sales of sports equipment archery placed first in dollar volume. This should be a challenge to all physical educators to keep abreast of the times, to become familiar with the sport of archery as it is practiced *today*. (There've been *many changes in the last few years!*) The responsibility of filling the great demands–supplying the educational needs brought about by this vast growth–lies in the hands of the physical education profession. Efforts made to fill this need will be well rewarded. In supplying the educational needs to students in archery, the physical educator can be assured of giving the student a skill and an interest which can be enjoyed throughout life. If students approach the advanced level, this satisfaction serves as a bonus for the instructor who has helped to bring about this achievement and the lasting joy that goes with it.

After the Basics - What?

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Once the basic shooting techniques have been presented and are being practiced, many teachers feel that the teaching of archery is completed. All that apparently remains to be done is to have the student diligently practice the fundamentals, and scores will consequently rise as good form is strengthened. To a degree this is true, but it does not mean that the archery teacher can go on vacation just because all students are releasing six arrows each end. As difficult as beginning archery is, the next steps become increasingly more complex. The reason for this is the great variation in rates of progress. Several students may be matched in background, coaching, and amount of practice and yet all may exhibit different levels of skill.

The Problem

After the basics—what? is a question which many teachers ask, and it is a question not easily answered. The problem of intermediate archery is twofold: (1) an increase in skill level must be achieved through continued practice using correct form, supported by sound coaching in basic techniques, and (2) there must be motivation which excites the student to achieve. It can be highly tedious and boring to shoot arrow after arrow and only achieve a random scatter. But when those arrows begin to hit exactly the right spot each time, excitement and interest begin to build. One of the greatest motivations in archery comes with the first six golds an archer shoots. The thrill of this experience acts to motivate the archer to repeat the act. Unfortunately, there is no easy way to that first perfect end. The teacher, therefore, must be creative and devise stimulating and interesting methods to help the student achieve this goal. If the approach is correct, the student will have fun while increasing her skill.

Improving Skills

The archer must continue practicing, for it is only through practice that she will improve her skill. At all levels, the instructor should frequently reemphasize the major points in good shooting technique. Individual coaching will be a primary teaching method used during

this time. Another important factor which is often overlooked is that the teacher, too, should continue to acquire as much experience and skill in the sport as possible. This will enable her to coach the intermediate archer in more realistic and practical ways.

As skill increases, the student gains ever greater confidence in her own ability. It is at this point that the archer sometimes becomes careless in her performance. The teacher must be able to spot any errors the archer makes and immediately correct them before bad habits form. For example, a student may be using good technique and seem to be following all instructions, and yet her arrows seldom land in the gold. Has she forgotten to aim or has she failed to aim carefully enough? This type of error is often difficult to spot, especially if the archer holds in the full draw position before releasing.

Students should be taught how to recognize and correct their errors. They can also learn to recognize errors in technique made by their classmates and can then assist one another to achieve better performance. This shared responsibility can benefit all.

Several specific items should be kept in mind while coaching intermediate archers. Be sure they achieve a consistent anchor position, which is essential to the development of good aiming practices. Continue to emphasize the use of the upper back muscles through out the drawing and aiming steps. Strive to have the student concentrate on careful aiming and to hold on the aiming spot for several seconds before the release. Stress the fact that relaxation in the string hand and bow hand is the key to a smooth release. Most important, remember that each student is different and must be coached as an individual.

Motivating Techniques

An archery class must be fun. It also must offer the student opportunity to improve skills already learned and to gain new experiences. By using a variety of motivating devices, the archery instructor will accomplish these goals and keep student interest and enthusiasm high.

Students should begin scoring as soon as possible, provided that the pressure for high scores does not interfere with the learning process. Short rounds can be devised to suit the skill level of the class within the time available. For example, shooting and scoring at two distances to simulate a regulation round is a simple yet effective technique. Class tournaments of a similar type can be scheduled in advance and held periodically. Simple, inexpensive awards and prizes can be made by the students. Interclass competition may be held

along the lines of a telegraphic or mail meet. When conducted by the students, such activities teach them how regulation tournaments are run. It may even motivate some students to seek out-of-school opportunities for competition.

Novelty events which demand precision in shooting should be used freely. The use of small target faces, small aiming spots placed on the target faces, animal faces, and balloons all require good shooting technique and careful aiming for success. The archer must use all the skill she has developed to win tic-tac-toe and bingo type games. With some encouragement and guidance from the teacher, the students can create their own novelty events. Make certain, however, that any novelties used do not foster carelessness in shooting.

Archery golf and field archery can be adapted for use in most programs. If a large field is available, a modified clout round should definitely be added to the class schedule. Clout has great appeal to men archers.

By providing a wide variety of shooting experiences, the teacher will find that her opportunity for coaching and improving the skill level of students is increased. Students who want to succeed in hitting a balloon, a deer, or a rabbit are likely to be more receptive to coaching than those who are confronted with the same five-color target day after day. The teacher should remember, however, not to become so involved in the event that she forgets that coaching must be continued during each class and that students must be constantly reminded that good form and conscientious practice are essential for their success.

The Use of Visual Aids in Archery

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An effective principle to follow in teaching is to "teach things, not words."[1] There being no one way only to do a satisfactory piece of work requires resourcefulness and ingenuity on the part of the instructor in the selection of methods and techniques of presenting activities to the students.

There came with the turn of the twentieth century an emphasis placed on visual aids. According to Dent, it was first thought that the most powerful factor in the educative process was the eye. The following illustrates this trend of thought:

> In the early stages of the development of the use of visual aids, it was thought that the eye was all-powerful in the educative process. Some were enthusiastic enough to state that 80 to 85 percent of all we know is learned through the eye. Others surmised that it would not be long until texts would be replaced by pictorial substitutes for the printed word. Later it was found that some of these speculations were a bit extravagant, if not absurd, and that the other senses are very important in receiving a clear impression of the material to be learned. It was found that the sense of touch aided materially in giving the correct concepts of objects-specimens-models. In other cases taste came to the rescue. And the sometimes unadorned ear is being recognized as highly important to learning. In fact, there are few psychologists who would attempt so to control all other factors that the true learning power of each of the senses might be segregated and measured.[2]

The question that arises at this point is what are visual aids? According to Hoban "a visual aid is any picture, model, object or device which provides concrete visual experience to the learner for the purpose of (1) introducing, building up, enriching, or clarifying abstract concepts; (2) developing desirable attitudes; and (3)

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[1]N. L. Hoopingarner and G. S. Wehrwein, "Visual Instruction Through Lantern Slides and Motion Pictures" (Austin, Texas: University of Texas, May 25, 1917), p. 7.

[2]Dent. *Audio-Visual Handbook.* (Chicago: Society for Visual Education, 1939), p. 1.

stimulating further activity on the part of the learner."[3] Koon lists other visual aids such as photographs, specimens, maps, graphs and charts, posters and cartoons, stereographs and other three dimensional pictures, lantern slides, film strips, slide forms, stereopticons, exhibits and motion pictures.[4]

Physical educators, though not the first to employ this form of instructional aid, have since the second decade of the twentieth century been most successful in the use of certain of the above aids. One of the best forms, of course, has been the "demonstration," which is not included in the types listed. Space does not permit dwelling upon the adequacy of visual aids in all phases of physical education; therefore, this paper will be devoted to their use in the successful teaching of archery.

Certain principles must be accepted and applied if visual instruction is to be an adequate technique in presenting the activity of archery. What the values of visual aids are may be summed up (1) in the function of their degree of reality; (2) in the nature and extent of the student's previous experience; (3) by the objectives of instruction in the particular situation; and (4) by the intellectual maturity of the learner.[4]

The forms to be selected for use in archery is the next step. Certainly a demonstration by the instructor presenting the activity of shooting in a continuous manner is good, but if this is preceded by illustrations of the various kinds of bows and arrows including the history of each type, a stimulus is provided.

Another stimulus is the handling of the tackle, which involves not only the eyes and ears, but also touch. There should be no "do not handle" sign, for, as J. Nash says this is "a teachable moment" and the correct manner of stringing, unstringing, and handling may well be taught at this time. Certain cautions and dangers may easily be included which will make a deep impression on the student. Also to include any humorous incidents that have come to your attention assists in providing stimuli.

At this point it is well to turn to a bulletin board if inside to stress certain phases. This board may contain commercial advertisements if appropriate. If there are any inaccuracies these should be pointed up, or the poster should not be used. It is a good idea to sketch in the correct form using a color that will show. The bulletin board may contain actual photographs either in action or in still-

[3]Hoban et al. *Visualizing the Curriculum.* (New York: The Cordon Co., 1937), p. 9.

[4]*Ibid.*, pp. 22-26.

form to provide study for the group. The advantage of having time to observe and study are provided by these. Cartoons are very effective.

Lantern slides or "condensed pictures" are small in bulk, may be carried easily, and can be shown in any space which can be darkened and which has a curtain hanging. The picture may readily be made large enough for the whole group to see it easily. They provide a great deal of interest and show the strenghts and weaknesses of the students shooting.

Charts, graphs, and maps are used in various ways as stimuli. One effective use is the charting of archers by states (using the national or state records) to show the popularity of archery. In the preparation of material for use in books the pictures and sketches must be educationally planned from the teaching standpoint. It should also be attractive to see, and practical from the point of view of administration. These points are clearly shown by Powdermaker.[5]

The most adequate form of visual aids is the movie, provided the action is in slow motion to make accurate observation possible. There has been a growing movement toward the production of educational motion pictures by physical education instructors which is very stimulating.[6] The student is provided with the opportunity to see what is right and what is wrong in her own action as well as in the action of her classmates.

Reasonable expectations in the teaching of archery, if these techniques are employed, are the development of good attitudes, a keenness and alertness in observation, learning relationships, unobservable action of self disclosed, and in the use of leisure time there may be a blending of the school work with actual life which in itself is stimulating.

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[5]Therese Powdermaker, *Visual Aids for Teaching Sports* (New York: A.S. Barnes & Co., 1940), p. 1.

[6]Hoban et al., *op. cit.*, pp. 135-143.

Correct Errors in Shooting Early and Often

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Many of the shooting problems which archers develop could be avoided if corrections were made early and often enough at the beginning of the individual's shooting experience. The most effective way to achieve success in shooting is to avoid repetition of faults so that they become habit. It is necessary for the instructor to repeatedly emphasize the most important points in the execution of the skill.

Group cues, repeated frequently, can accomplish much to reinforce the learning of proper techniques and will keep students thinking positively while learning how to shoot. The following suggestions will help considerably to keep faults at a minimum and will speed progress:

1. The use of toe markers on the shooting line will help to keep students in proper stance for shooting and is an important safety factor.
2. The nocking point, marked at the correct place on the bowstring, will help to prevent errors in nocking which will affect the flight of the arrow.
3. Use of lightweight bows, with arrows of the proper length for the individual, is essential. Shooting a bow that is too heavy and arrows that are too long will create many problems and tend to discourage the beginner. Using arrows that are too short causes serious accidents and makes correct bow arm position impossible.
4. Armguards and finger tabs are a must for the protection of the archer as well as for the prevention of errors which definitely occur if they are not worn.
5. It is essential to wear suitable clothing, void of anything that will interfere with the path of the bowstring. A snug fitting T-shirt or sweater is ideal. Avoid heavy, bulky sweatshirts, jackets, or anything with buttons, pins, or pockets that would obstruct the path of the bowstring on the release. Any interference will affect the flight of the arrow and can cause injury.

The teacher must be aware that all of these points can impede the student's progress and cause unnecessary faults in shooting. Once the basics of shooting have been learned, the archery instructor will find endless need for making individual corrections and giving continued coaching helps. Each student will have her own problems and, since

no two will be alike, this presents a constant challenge for the conscientious archery instructor.

A FEW FAULTS AND CORRECTIONS

Some of the most common faults that beginners develop and a few suggestions for correcting them are–

1. Drawing

a. *Fault:* Tension in the string hand and pinching the nock causing the arrow to fall away from the bow.
Correction: Strive for relaxed fingers. The fingers should merely act as "dead hooks" on the string with the upper back and shoulder muscles performing the work in the draw. Have the fingers barely touch the nock. The string may be placed in the first joint of the three drawing fingers. The elbow should move backward from the beginning of the draw.
b. *Fault:* Using the thumb to help draw the string.
Correction: Relax the thumb and have it resting, useless, down in the palm of the hand. It has no part in the draw or the anchor.
c. *Fault:* Drawing the string in front of the body.
Correction: Emphasize keeping the string close to the arm during the draw.
d. *Fault:* Third finger not on the string or not being used in the draw.
Correction: Be sure all three fingers are on the string and the elbow is not too high. Work to keep the elbow at shoulder level at full draw. Emphasize the backward movement of the elbow.
e. *Fault:* Too much extention of the bow arm.
Correction: Remind repeatedly about keeping the bow arm rotated down and out, not quite completely extended.
f. *Fault:* Hunching the shoulder of the bow arm.
Correction: Place a hand on the front of the shoulder and apply gentle pressure until it is in proper position. Stand behind the student while doing this. Again, stress the use of the upper back and shoulder muscles and encourage the student to squeeze the shoulder blades together. A very light bow, 15 to 18 pounds, is essential to correct a forward shoulder.

2. Anchoring

a. *Fault:* Anchoring with the mouth open or the teeth not together.
Correction: Keep the mouth closed and in the same position for

each shot. Any change in the position of the lower jaw will change the trajectory of the arrow. Chewing gum is taboo!

b. *Fault:* String not lined up with the center of the face.
Correction: Have the student touch the string to the center of the chin and to the tip of nose, if possible.

c. *Fault:* Anchor not definite.
Correction: Guide the student's hand to the proper anchor point. Emphasize having the string hand come to the same spot on every shot. A consistent, positive anchor is vital to good shooting.

d. *Fault:* Moving the face out to meet the string and drawing hand.
Correction: At the beginning of the draw, the face should be turned to the target and kept in this position until after the arrow is released.

3. Aiming

a. *Fault:* Aiming with the wrong eye.
Correction: Be sure that the right-handed archer is aiming with the left eye closed. Have the student practice winking to develop these muscles, if closing the correct eye is difficult.

b. *Fault:* Improper placement of the bowsight or point of aim.
Correction: Be sure that the principles of aiming are understood and that the student knows how to correct the aiming device.

c. *Fault:* Releasing before the sight settles on the center of the gold or the point of the arrow on the point of aim.
Correction: Insist that the student hold long enough, at full draw, for the muscles to steady so that aiming can be accurate. Practice the draw, anchor, aim, and hold without releasing.

4. Releasing

a. *Fault:* Allowing the arrow to creep forward before the release.
Correction: Continue to remind the student to use the back muscles and keep squeezing the shoulder blades together until the moment of release.

b. *Fault:* Jerking the fingers off the string.
Correction: Emphasize the relaxation of the string fingers and guide the string hand back across the neck on the release.

c. *Fault:* Allowing the bow arm to move on the release.
Correction: Keep the bow arm at the same height on the release as it is at full draw and avoid moving it right or left. Encourage the student to direct the bow hand into the gold on the release.

5. Follow-Through

a. *Fault:* Dropping the bow arm.
Correction: Emphasize the importance of holding the release position, keeping everything in alignment, until after the arrow hits.
b. *Fault:* Bringing the string hand away from the neck.
Correction: Guide the string hand to keep it close to the neck. This will keep the hand in alignment with the center of the gold.
c. *Fault:* Not holding the follow-through position long enough.
Correction: Keep the after hold position several seconds longer than necessary to ensure completion of the shot.

The archery teacher and coach should be able to readily spot errors and make corrections. Emphasis on good form and a guiding hand to help the student get the feel of the action are the most essential points in giving students a good start in archery. These call for close observation of the fine points in shooting as well as detecting the obvious errors. The prevention of developing bad habits is the greatest contribution a teacher can give her students after the techniques of the sport have been learned.

Don't Let Your Class Suffer from "Archery Apathesia"

BEVERLY GOSSELIN LEE
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Do your arrows ache and quivers quake?
Do your students sag from that tired drag
Of shooting at targets day after day
With never a change coming their way?

Try the field anchor! Hide that sight!
Give them the thrill of shooting "Flight,"
Throw away old faces, put a stake and flag out . . .
Watch how they'll love archery golf and clout.

Here are two useful ingredients in concocting the necessary archery vitamin pill. You will find that they take only a little or no extra work but bring results.

CLOUT SHOOTING

Technique

Sighting Devices. Most sights for clout shooting are mounted on the lower limb of the bow, on the same side as the sight used for target shooting. The greater distance of the target requires a higher arrow trajectory. To achieve the correct trajectory, the angle of the bow must be raised which necessitates lowering the sight to keep it on the aiming point. This sight should probably be placed on the lower limb of any lightweight school bow when shooting at a distance greater than 50 yards. An economical sight may be constructed by placing a piece of adhesive tape on the lower limb and inserting a large head common pin in the side of the tape at the proper height. Another style sight is a toothpick held in place by a rubber band.

Aiming. The draw is made as in target archery. When full draw is reached, the upper body and bow, as one unit, are tilted back, away

from the target, until the sight rests on the aiming spot. The clout sight should be aimed at the point where the flagstick, indicating the center of the target, enters the ground.

Variations

Short distances. When facilities prohibit a regulation clout range, the shooting distance may be shortened by the use of weighted arrows or flu-flus. The same techniques may be used and benefits derived as at the longer distances. Shooting with different types of arrows may also be introduced as a novelty event.

Dollar Deal. Using target staples, affix one or more dollar bills to the ground on any part of the scoring area (preferably the gold). An arrow completely penetrating a bill wins that bill for the shooter.

Novelty. Although clout shooting is primarily a distance event, novelty events may be run in a limited indoor area by the use of special arrows–weighted or flu-flus–prepared to decrease flight distance. Weighted arrows may be made by attaching plastic whiffle golf balls to the pile end of a regular target arrow. Flu-flu arrows have additional feathers attached to increase wind resistance, resulting in a short, abruptly terminated flight. They can be easily made by taking featherless arrows and spiraling a single 10 inch feather around the upper shaft of the arrow, gluing it permanently into position. It may help to pin both ends of the feather onto the arrow while the glue is drying.

A clout target may be simulated by placing a 48 inch target and face flat on the gymnasium floor. Use of mats and protected arrow tips may be necessary for increased safety and floor protection.

ARCHERY GOLF

Equipment

Balls and Stands. To indicate each of the golf holes, a hollow rubber softball may be supported on a wire stand 12 inches high with a small platform on top to hold the ball in place. The object is to knock the ball off the stake with as few shots as possible.

Special Arrows. Included in the quiver should be a flu-flu or blunt point arrow for use on an approach shot or holing-out to prevent the arrow from skidding a long distance along the ground.

Technique

Flight Shot. The first shot from the tee area should go as far down the fairway as possible. To achieve the greatest arrow distance,

the bow should be held at approximately a 45 degree angle in relation to the ground. This position is best attained by a method similar to that used in clout shooting–tilting the upper body and bow back and away from the target after full draw has been reached. In this situation the elbow joint of the bow arm can be used to estimate the 45 degree angle by sighting it on the horizon.

Approach Shot. When nearing the hole it is desirable to estimate the remaining distance and make the type of shot which will bring the shooter as close to the ball as possible. This shot would afford a particular advantage to an instinctive archer who is able to judge various distances.

Holing-Out. In knocking the ball from the stake, it is good to use a flu-flu or blunt point arrow to reduce the chance of overshooting a great distance. Different draws may also be used to prevent overshooting. A half draw with the bow in a vertical or horizontal position is most frequently used. In addition, the nature of the terrain may require the use of a high looping lob or "blooper" shot, with the bow on a horizontal plane.

Give in proper dosage.
Be careful not to spill!
To pep up any program
Make use of the apathesia pill!

Competition in Class Time

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A varied program of events in the archery class can provide incentive and effort for betterment of skill. Some of these techniques should be useful in your classes.

Average Arrow

1. For purposes of grading and easily recognizing improvement, the use of average arrow is an efficient method.
2. If students don't have the same number of arrows, average arrow gives a good indication of actual score.
3. Procedure: The total number of arrows a student shoots is divided into the total score.
4. Average arrow can be taken at separate distances for a combination of distances.

Work Up

1. The purpose of work up is to get on target #1.
2. Put three or four students on a target.
3. The group at each target has individual contest for one end.
4. The winner of each group moves up one target and the loser of the group goes down after each end.
5. One week participation for high school is recommended.
6. If a tie results, go back to the person who shot highest on the previous end.

Handicap Teams

1. Handicap teams can be used for any type of round or archery activity.
2. After students have turned in scores for at least one round, stack the cards from high to low.
3. Next class period, have the students line up from high scorer to low scorer. Call out the scores and tell the students to write them on the back of their new cards.

4. Have the first four people go to target #1, the high scorer acting as team captain; the next four people in line to target #2, etc.
5. During the period, the instructor adds together the previous total for team #1. She tells the captain they have no handicap.
6. The instructor adds the four totals for team #2. She subtracts the total from the total of team #1. The handicap score for team #2 is 80 percent of the difference. The handicap is given to the captain of team #2.
7. This procedure is followed on down the line, each time subtracting from the totals of team #1.
8. After the tournament is completed, the team captains add the four new scores plus the handicap and give this to the teacher. Winners are announced.
9. Handicap teams are good because they allow the poorer archers to win if they shoot above their average.
10. If a student is absent it is recommended that the team captain be given the old total score of the absent individual with a minus 10 points.

Color Shoot

1. The students try to shoot all of one color. For example, four blues would beat three reds.
2. After each end, while walking from the targets, the teacher asks if anyone has higher than four of one color. If affirmative, the teacher asks who has the highest and how many she has.
3. Tallies of wins can be kept in the roll book and at the end of the semester the three students can be announced.
4. It is fun sometimes to make one of the colors a wild color. In other words, the teacher could say that white could be any color so if a student had two whites and three reds it would represent five reds. Six of one color is best, five of one color is next, and four of one color next, etc.

Ye Able Archer

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Have you tried clout, flight, field archery, archery golf and hunting? Never heard of them? You've missed half the enjoyment archery has to offer. The fun of target shooting may be increased tenfold by using your skill in other ways. With each new event you add interest, ability, and even many archery friends.

When you have learned to handle a bow, and can usually hit the target at a given distance, you may look around for something new to try. Here are a few suggestions:

Clout It's fun to shoot an arrow into the air, and have a few moments elapse as you carefully try to follow your arrow to its target. It's fun to watch the air currents carry your arrow and to correct your aim as nearly as possible for wind drift. Spectators enjoy a clout shoot, too, as it takes longer for the arrow to get to its target, and the target is much larger.

The same bow and arrows may be used for clout as for target shooting, except that the bow must be strong enough to carry the arrows to their target. Men shoot 36 arrows at 180 yards, while women shoot the same number at either 140 or 120 yards. The target lies flat on the ground, is 48 feet in diameter with 9 3/5 foot center, and has a short flag flying from its middle. The rings of the target are made with either lime or tape. Scoring is the same—9, 7, 3, 1.

Except for aiming, the techniques for clout are the same as those used for target shooting. One must aim under her bow hand, lining up some part of her bow with the flag in the target. A rubber band holding a match that may be aimed with the flag in the target will do the trick, and it's easily adjusted if you're over or under shooting.

For a group and novelty shoot, the distance may be varied to suit the area available or the limited cast of your bows. But if you've reduced the distance, make the target a bit smaller to simulate standard conditions.

Flight *Flight,* in archery is shooting for distance. No element or need for accuracy is involved—only distance. Thus, the technique and equipment required are quite different. Bows generally are short in length, have great cast, and are usually fairly strong. Arrows must

be light, yet stiff enough to stand in the bow; and in place of feathers, small feather-shaped pieces of celluloid are used for lightness.

The bow and arrow are angled into the air, the string quickly pulled back the greatest safe distance, and plucked loose. Arrows may be somewhat longer than normal, but care must be taken not to overstrain the bow. Flight shooting requires a good deal of special practice and equipment, and the technique is so different from target shooting that flight archers usually aren't champion target archers, and vice versa. However, if space is available, distance shooting meets or events might be held, using regular equipment and not-too-changed techniques. *Great care* must be taken not to overdraw bows when eagerly attempting to gain distance.

Archery Golf Archery on a golf course can be played quite as nicely as golf—and with similar scores for an equal number of "holes." Long drives may embody flight techniques, while the putts (the target being beside the hole) call upon one's best field archery or roving ability. Many archers use flight equipment for the drives and ordinary target equipment for approaches and putts. Each shot is a stroke, and on some courses if you're only an arrow's length from the hole, one stroke is added and the player tees off at the next hole.

Hunting Though not practiced by women so much, men delight in hunting. It's the oldest form of archery and is still very very popular. Here is involved shooting at varying distances and at moving targets —a highly exciting game calling for the judgment and skill that comes from much practice. Heavy bows are used, and the legendary broadhead, or steel-mounted and barbed arrow. A quiver of arrows and a brisk walk into the woods or across fields in the country may yield anything from squirrels and rabbits to the big game that hunters with the best rifles so often fail to bag. Many states reserve hunting areas for archers alone, and archers get their deer.

Field Archery If you have neither the special equipment nor desire to hunt, there are many interesting and novel variations in which ordinary bows and arrows may be used. For instance, if a wooded area is available, a course may be set up, using painted animals for targets, and varying distances and angles from which to shoot progressively around the course. If you hit the heart of the animal, score two; if you hit the animal, score one.

Ordinary archery targets may be used, replacing the target face with animals or other figures painted on paper. Vary the distances from target to target, as well as the size and shape of the "animal." See if your hits become more than just luck.

Clubs and Tournaments

Make Your Archery Program Click

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School and college archery programs are only as strong as student support makes them. The more the students assist in planning archery activities and accept responsibility in carrying out these plans, the better the total program will be. Stimulating interest in archery begins in classes where students should find that the sport is fun and that it challenges them mentally and physically. The archery instructor can assist this process in many ways through the use of novelty shooting, class tournaments, and other special events. Once the interest of the students is aroused, however, it must be kept alive and continually reinforced to insure a successful archery program.

In college situations, the archery instructor usually has a student manager who is a member of the WAA or WRA board. High school instructors can enlist the help of a GAA member who is particularly interested in archery to assist her with the program. One of the largest tasks facing faculty and student is publicity. Attractive bulletin boards, posters, flyers, and newspaper articles are valuable. But the most important and most effective means of publicity is through personal contact. There is no substitute for word-of-mouth publicity, particularly with the battle which is being waged on many campuses for students' free time.

Practically every school which includes archery in its class schedules can find time for extra hours of shooting and instruction each week. This is essential, as it provides the students with an opportunity to improve their shooting ability beyond what is normally possible in classes, and leads, in turn, to greater interest as skills increase. If possible, these "open hours" should be continued throughout the winter. A simple, inexpensive backdrop of three layers of burlap hung approximately six inches apart makes an adequate backstop for shooting up to 20 yards. Greater distances may be simulated by the use of 36 inch, 24 inch, and 16 inch target faces. Where indoor shooting space is not available at school, local facilities may provide a suitable area. Archery clubs in the vicinity which have indoor ranges might be willing to permit students to use their facilities in the afternoons.

Probably the best single means of stimulating archery in your school is to hold an archery clinic. This will bring in an expert in the

field who can explain and demonstrate various phases of the sport, and coach the students in target technique. This coaching is particularly valuable if it can be done in individual archery classes as well as in mass session. Such a clinic can add to the prestige of your school if an invitation to participate is extended to nearby institutions. Assisting archery programs in these schools will provide your students with more chances for playdays and informal tournaments. In addition to the clinic, movies can be rented and shown for further variety. Local archers, proficient in a particular phase of archery such as hunting, can be invited to demonstrate and talk about their specialties.

Merely awakening interest in archery, and even having students come out to participate is not sufficient. A well rounded archery program, designed to teach each student what they want to know about archery and letting them have fun learning it, must be instituted or the interest will wane. Here is the place where the students can be put to work. A preliminary conference with your manager opens up possible types of events and dates for the season's program. At this conference, too, a potential committee of interested students might be drawn up. Your class rolls will be of value in this. The manager should contact these people and find out whether or not they are willing to serve. She might also put up a sign-up poster for the committee on the range.

If this is the first time that such a committee has functioned, their initial task will be to determine the form they wish the archery group on campus to take. Will they establish the formal structure of a club, or will the group remain informal with perhaps an honor club or a six golds clubs for students who achieve certain scores? This will, in part, depend on the policy of the WAA or GAA involved. Perhaps the committee will feel that they wish to establish intramural competition on a class, dormitory, individual, or team basis. Again, the prevailing school pattern may be a guide. If there is no pattern, they may establish one that they feel will best fit their situation. This group must then set up a tentative program for the season—what tournaments it wishes to take part in; how many play days it wishes to hostess; what special events, such as a shoot and picnic to end the season, it wants to sponsor. Specific activities will vary according to the situation; high school or college, all-girl or coed. This committee, too, could set up a publicity campaign to bring its activities to the attention of the student body—a campus carnival where they could have a booth, an assembly where they could demonstrate trick shooting, any opportunity that they can find to show their program. It is important that the committee realize the details of the work involved in the activities it plans to undertake, and that the work is divided up at this initial meeting so

that each student knows what is expected of her and how much time she is given to complete her task.

As the archery instructor you will be called upon by the committee for advice on everything from how to correct arrows that fly left to the correct wording for an invitation to a playday. In addition to your role as guide to the committee you will want to assist the program yourself, in and out of classes. The weekly posting of scores, individual improvement charts, tournaments matching one beginners' class against another, or anything in this line that will stimulate your students to improve their scores should help your program. A colored tassel system with the tassels awarded weekly on the basis of the previous week's scores, and the GAA award system, applicable to high schools, are other examples of interest-stimulating devices. Another particularly good one is to offer a steak dinner to anyone who shoots six golds. (If the winners are too numerous for your budget you can increase the required distance.) Many students will become interested in equipment and its repair. Where the school regulations permit, a needy student might be permitted to repair school arrows and make strings.

The real foundation of every extracurricular program is its open hour schedule. Open hours as well as classes need variety. This is the place where students can learn and practice other than target techniques. Especially if the program is coed, field archery and hunting sessions are a must. Novelties are always fun. Described below are a few which may give you and your student committee some ideas.

1. Caricatures–Cardboard likenesses of faculty members or outstanding students make popular targets.
2. Wand shoot–A narrow wooden post (6 feet x 2 inches x 2 inches) is placed at an appropriate distance for your group's ability. Only direct hits count.
3. Robin Hood shoot–Team of 4 on each target. After first end (or more) total number of golds on each target are counted. Target with lowest number is eliminated. This team may then "heckle" other shooters in any way except by personal contact. Continues until one target wins.
4. Reverse scoring–Scores of target colors are reversed with white 9, etc.
5. Determine scoring value after shooting–After each end is shot, the person in charge announces what arrows are to count for that end, i.e., all arrows landing on a line score 3. Other arrows do not count.
6. Shooting from different positions–Sitting, kneeling, standing on a chair, holding the bow parallel to the ground, right handed archer shooting left handed or vice versa, and others can be used for variety.

7. Moving targets–Cardboard animals or other targets can be hung from a rope and moved back and forth accross the shooting area by means of a pulley system.

8. Roving–Numbered or illustrated cardboard cartons can be placed around the range, each with a separate shooting line. They are shot at in turn, and perhaps from different positions.

9. Bingo–Cardboard target in the form of a bingo card. To win, archer must make five in a row in any direction. To simplify, give a free space in the center or reduce to tic-tac-toe target, three any way.

10. Miniature archery golf–Set up in the same form as the regular game but with targets that will permit the passage or entry of arrows. Scored by the number of shots required to complete the course.

The preceding paragraphs have given various suggestions for making your archery program click. The necessity of having student support has been pointed out. Your big job as the instructor is to gain their initial support; you must start the arrows shooting.

Archery - The Intramural Program

BERNICE FINGER
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Archery as a recreational sport offers an opportunity for a varied and interesting program from the viewpoint of types of organization, range of groups who may participate, and content of program.

Organization

An intramural program in archery lends itself readily to two types of organization, namely: the club organization, and the traditional seasonal program. The archery club offers the better type of organization to develop skill and a lasting recreational interest in this sport. The club may be organized in a fashion similar to that often used by swimming clubs and dance clubs. This type of organization frequently requires a minimum degree of skill for eligibility to membership in the senior club. The applicant demonstrates his skill by participating in a series of events set up by the club and scheduled as tryout periods. This type of organization usually provides also a junior club which serves as a feeder for the parent club. Membership in the junior group is open to all interested in the sport and requires no minimum achievement. The two clubs may either meet separately or together for scheduled shoots, depending upon the sizes of the groups and facilities which are available.

On the other hand, the club may have no eligibility requirements for membership. Under this plan, the club exists and meets at regularly scheduled times, thus bringing together at one time a group of people with a common interest. In this type of club, the program of activities should be geared to the needs and interests of the various skill groups.

The seasonal plan for an intramural archery program can be organized along the line of other seasonal sports programs. In this type of organization there would be need of a practice period followed by the tournament period; the needs of the various levels of skill should be provided for in the tournament program.

Groups Participating

Archery is so flexible that it can be enjoyed by many with physical limitations as well as by the most robust of athletes. It appeals

to age groups of both sexes from junior high school through the university. (Since this article deals with the intramural program and since this type of program is almost always associated with schools, the above reference to age groups is made with respect to school programs excluding the out-of-school club programs which know no age limit).

The type of organization set up for the archery intramural program should take into consideration all the groups of people who might be interested in this sport and should be developed according to the potentialities of the specific situation. In high schools, colleges, and universities where both boys and girls and young men and young women are interested in this sport, the intramural program should be so organized as to bring these groups together. In this event, the program should provide coeducational events as well as events for each group independently. The social experiences provided in such a corecreational program are not to be forgotten as a significant part in any program that is educationally sound.

Program of Activities

The actual program of activities is the secret of success in the archery program whatever the nature of the situation, the participants, or plan of organization.

The program should be varied and comprehensive enough to meet the needs and interests as well as to stimulate and challenge all skill groups represented.

For the beginner there should be practice periods with expert coaching. There should be novelty events as well as competitive events at the shorter standard distances. The beginner should be encouraged to keep his own record of progress in both practice events as well as scheduled competitive events. Inexpensive individual record books could be provided for this purpose. For those beyond the beginner class, opportunity for practice and competition should be provided in all the standard rounds.

The more advanced archers should keep their own records of progress in each event, and expert coaching should be available to them. Competitive events can be worked out in each class of competition on an individual and team basis. Archery lends itself to interclass competition, intersorority, interfraternity, independent teams, and coeducational teams. Yearly records for established units of competition may serve as an impetus to get a program under way from year to year. Whatever the local organization of the athletic program might be, the type of archery season as indicated above could be readily incorporated whether there be a point system, per

cent participation system, or an assocation of the most informal organization.

In addition to the regular target events, a well rounded program might include some of the following:

A. Standard Competitive Events
   1. Team shoot for women
   2. Team shoot for men
   3. Team shoot for men and women
   4. Pope Young Round
   5. Clout shoot
   6. Wand shoot
   7. Butt shoot

B. Novelty Events
   1. Archery golf–competition between archers and golfers
   2. Hiawatha shoot
   3. Shooting for distance–flight shoot
   4. Roving

C. Special Events

A regular meeting of the club could be pepped up or a special shoot could be scheduled for the special days of the year. Examples:

   1. Circus day – using balloons, clowns, "clay ducks," and the like instead of regulation target faces. This event might be conducted as a "white way" with program of events giving chance to all levels of skill.
   2. Halloween – replace target faces with witches, black cats, pumpkin jack-o-lanterns, apples on strings.
   3. Thanksgiving – turkeys – wild game
   4. Christmas – deer, Santa Clauses, Christmas trees
   5. New Years – horns, bells, caps
   6. Valentines Day – hearts, cupids

D. If the school is located in a community in which there is an archery club, the program of events of this group could be drawn upon to supplement that of the school.

E. Hunting with the bow and arrow might prove to be of great interest to those in some sections of the country where this sport is not uncommon. Especially in schools where there are young men interested in the sport, this aspect of the game might be promoted. Some states have set aside special days for game hunting with the bow and arrow.

F. Films could be used to enrich the club program in several aspects of archery.

The climax of the program for college women might be participation in the National Telegraphic Archery Meet sponsored annually by the American Archery Association.

The intramural archery program should be well publicized throughout the school system. Advance notices of coming events as well as publication of team and individual records in all classes of competition as they are made and broken from year to year serve to promote interest on the part of others to join in the fun of archery.

"Why Don't YOU Sponsor an Archery Clinic?"

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We all sense the growing emphasis that is being placed upon individual sports and their place both in school and in later life. The increasing number of participants, as evidenced in the past few years' attendance at the national archery tournaments, is an indication that archery is becoming a very satisfying outlet for individual as well as family recreation. There is no age limit. One does not have to be an expert to enjoy this sport. The sponsoring instructor should keep these throughts in mind during the planning of her clinic. Archery needs to be more widely promoted. One way this can be done is through clinics and playdays.

I. Before the Clinic
   A. Draw up first announcements to be mimeographed on physical education department stationery if possible. Include the following information in this first announcement:

      1. What is the event? (Clinic and/or playday)
      2. Who is sponsoring it? (P.E. Dept. or archery club)
      3. Date (Month, day, and year)
      4. Time (From when to when)
      5. Purpose? (Stimulate interest and improve skill)
      6. Who is invited? (Teachers, students, physical education majors, camp counselors, etc.)
      7. Program? (to include):
         a. Names of guest instructors, if any. (Position and where they are from).
         b. Statement of purpose: Instruction in teaching techniques, rules, how to select equipment, etc.
         c. Tournaments (open to all): Target, clout, golf, roving, field archery, if available.
         d. Demonstrations of target technique as well as skill for other archery variations.
         e. Displays (books and tackle).
         f. Visual aids (movies, slides, filmstrips, etc.).
      8. Registration fee. Items covered by it, i.e., lunch, target fees.

9. Statement the second announcement will come soon.
10. Signature of sponsor and school or club.

B. On the mailing list, include all schools, colleges, and clubs in wide area, perhaps using school and club directories for your state and neighboring states. Send letters to physical education director or principal.

C. For second announcements, if possible, have an archery photograph "cut" made. Any photoengraver can do this. The second announcement should be arranged attractively so that it makes good bulletin board material as well as being instructive. It should include headline of event, sponsoring group and date, and an hourly schedule such as the following:

10:00 A.M. Demonstration of target shooting technique
10:30 A.M. Columbia round mixed team tournament
10:30 A.M. Teaching archery technique
11:30 A.M. Tournament rules and regulations
12:00 P.M. Lunch
1:30 P.M. Movies, film strips, slides.
2:00 P.M. Teachers practice coaching own students
2:30 P.M. How to select and buy archery equipment (tackle manufacturers)
2:45 P.M. Demonstrations of archery; golf, clout, field shooting, roving
3:00 P.M. Archery golf — Golf course
Clout shooting — Archery course
Field shooting — Field course
4:30 P.M. Further demonstration of techniques in target shooting.

Send photo cut and text form to the printer, have galley returned; correct it and then, to press!

D. Early in the organization, establish student committees, perhaps using your archery manager as the general manager. These committees should include: publicity, program, lunch, finance, registration, hostess, and range assistants for target shooting, clout, golf, field, and roving or for as many events as will be included in the day's program. Also select Lady Paramount and scorers. If your school does not assume the responsibility of marking the range, putting targets and bales of hay up, etc., arrangements will have to be made for this too.

E. Decide what the fees are to be. The price might be different for some attending than for others, depending upon how many come for just the clinic, just come to shoot, how many wish lunch, etc. It is essential that the clinic and playday finance itself wherever possible from these fees.

F. Enclosed in the envelope with the second announcement should be an addressed mimeographed return postcard to this effect:

(am)
I (am not) planning to attend the archery clinic, which will be held ? at ? .
I shall send ? students and ? teachers, prospective teachers, physical education majors, students, camp counselors.

Signed .....
School .....

The due-date for these cards should be included in the second letter.

G. Make arrangements with nearby school and/or clubs to borrow targets for the tournaments if necessary. Rent or borrow bales of straw for a field archery course, if you are going to have one.
H. Send announcements of clinic plans to *Archery World.*
I. Arrange with publishers or individuals to borrow archery books, pamphlets, and magazines to be displayed.
J. Contact, well in advance, if desired, some manufacturers of archery tackle. They will probably be glad to set up displays of all the latest archery tackle and gadgets the day of the clinic.
K. Arrange lunch for all at a nearby place, if possible.

II. The Day of the Clinic
A. Register everyone who attends the clinic and playday. Those who are going to shoot should be assigned to a target at the time they register in order to mix the teams.
B. Try to have the following included in the program at some time during the day:
1. Actual demonstration of championship form in target shooting by a champion as one of the first events.
2. Also, early in the day have the proper teaching progression presented to the whole group in a way that *all* can participate in the mimetic drills, and actually have some group coaching. This is important since many people who attend these clinics are eager to learn about techniques and will undoubtedly carry those teaching methods and progressions back to their own school situations.
3. Try to obtain movies of some kind which show the essentials of archery technique for beginners.
4. It also increases interest to include a movie on the recreational aspects and variations of archery. Movies and

other visual aids may be presented to the teachers and instructors at the same time their students are participating in the various tournaments.

5. At the end of the clinic, the scores and results should be announced and awards presented. (Suggest practical items be given, such as arrow wipers, finger tabs, armguards, quivers, etc.)
6. Acquire archery technique charts from DGWS.

III. After the Clinic

A. Send follow-up articles to archery publications, giving the number of persons who attended, who they were, where they were from, tournament results, etc.

B. A letter to each person who attended the clinic should be sent soon after the clinic has been held. It should contain results of all scores, addresses of places where all the visual aids which were used might be obtained, and the names of all archery tackle manufacturers who displayed products.

C. Compile a report on your clinic for future use by your school or by others.

It is strongly urged that the groups which are invited to all clinics include both men and women, also juniors whenever possible.

Care should also be taken to obtain good people to conduct your clinic, ones who can present material graciously and accurately to the group about teaching methods and technique as well as being able to demonstrate in good form.

Aids in Running an Archery Tournament

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Greene, New York

It becomes the lot of each of us in physical education at some time to organize or to prepare our students for participation in an archery tournament. Many of us have never become archery enthusiasts so we know little about such tournaments. Not one of us would ever consider sending a group of girls to participate in a hockey playday who knew nothing about hockey rules and regulations; but this seems not to hold true in archery. I've attended, and so have you, tournaments conducted by physical education people where many of the participants violated most of the skill rules, many of the safety rules, and all of the rules of tournament etiquette. Since this situation exists it behooves us to do what we can to correct it. All of us, in our physical education course in college, were exposed to the basic steps of shooting; beyond that point, many of us know very little. I shall try in this article to give you some of the aids that we all need so badly.

Teach for Participation

Archery is *not* a spectator sport. It is definitely for the participant. Since it is an individual sport with a strong appeal and much carryover value, it must be presented enthusiastically and not casually as a leftover for the "weak sisters" in your program. Instructions should be given for all so that there is a universal desire to participate in an intra- and extramural program. Archery can be done alone in your own backyard but most of its fascination lies in competition and in meeting friends who are "bitten by the same bug." I know of no other sport where rivalry is so keen and yet there is such a feeling of friendliness among the contestants.

When teaching, always consider each practice session as a small tournament. Follow tournament rules and regulations. Make safety rules a part of archery so that the two always go together in the mind of the participant. For example, all archers shoot at the same time and at the same distance, and retrieve at the same time. I've seen this simple safety precaution violated many times – so have you! The wonder is that more people haven't died as a result. When archers at one target are shooting, while the people at the next target

are retrieving, what is to prevent a flinch which will put an arrow through the back of the girl at that next target?

Teach the participant the correct method of scoring. Mimeographed score sheets are simple to make. Your school office can run off all you need for a season in 15 minutes. Two girls on each target should be scorekeepers and record the value of each arrow individually, starting with the highest. Always have one girl act as target captain and draw arrows. If this simple procedure is followed in practice sessions, it is not an innovation when encountered at a tournament. Be sure to teach the proper scoring for rebounds (7 points at 60 yards or under) and penetrations (an arrow passing through any part of the scoring face counts 5). Teach girls the correct way to judge arrows that cut two colors. Be sure they know that an arrow that cuts two colors must be counted for the lower score if a single arrow has been touched or drawn from the target before the questionable arrow is discovered.

Teach the students how to retrieve arrows that fall in front of the shooting line. In practice, see that students use the bow to pull the arrow back while standing in their shooting position. Never let them walk out to get it while shooting is in progress.

Teach the participants to step back three yards from the shooting line when they have finished shooting. This is a tournament regulation which becomes habitual when practiced at all times. If you work with high school girls, the reason for this rule is apparent. There is no age when girls are so giggly or talkative, and the archer on the line can be easily distracted. When the student learns to do this simple thing in the first class session, it becomes a part of archery.

Teach the participants that quiet on the shooting line is a regulation. It is a courtesy that they expect from their fellows and, therefore, one they owe in return.

Avoid direct coaching while the student is in the act of shooting for scores. Tournament regulations specify that no coaching may be given while a person is shooting. Save your direct coaching for practice sessions when the girls are not shooting for scores. They should not become too dependent upon you as a coach – they need to develop their own critical analysis.

Teach them the meaning of the whistle. Use *one* blast on the whistle to start shooting and *one* to retrieve at all times. Use two blasts for an emergency so that they understand that it means to stop shooting immediately.

When archery skills have been properly taught and the above rule of archery etiquette is firmly entrenched, the resulting archer is one you would gladly have as a participant in any tournament.

Organize Your Tournament

The first step in the tournament you are to organize is to decide what round or rounds are to be shot. With high school students a team round has definite appeal – the responsibility for winning does not rest on one individual but on a group. The team round recognized by the National Archery Association is 96 arrows at one distance, 50 yards for women, and 40 yards for intermediates (boys and girls). In many places, a Junior Columbia Round is used on the basis for a team round. Each team is composed of six girls and the highest four scores are totaled for the team score. Allowing six girls to shoot then totaling the top four scores allows a larger number to participate and makes allowance for the archer who is having an "off day."

Once the round is selected, invitations should be issued with a request for replies. It is essential to know how many are participating to make proper preparations. Planning for 150 archers and having only 110 appear can be disconcerting.

Selection and preparation of the field is next on the list. The grass should be short and free from stones around the target. All lines should be visible and the targets firmly staked to the ground. Unless your range is in a secluded area where there will be no spectators, it should be roped off 10 yards in back of the shooting line and on either side to prevent accidents. All targets should be numbered for ease in identification. This also facilitates target assignments.

It is well with high school or college groups to have a scoring committee set up to issue scorecards and pencils at the beginning of the tournament and then collect and tabulate at the end. I've found that a short novelty event, such as a balloon shoot, while the tabulating is going on breaks down tension and builds up friendliness among the group. Archery is fun; do everything you can to make it so.

Aids for the Archery Tournament Official

OLIVE U. CROUCH
Former Secretary National Archery Association
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The National Archery Association says the duties of the Lady Paramount or field captain shall be: "to call the archers together for competition; to direct, oversee, and manage all competition and the conduct of the archers during that time; and to interpret and enforce the traditional and statutary rules of archery, in which her decision shall be final."

Here are a few helpful suggestions for anyone invited to be the field captain or Lady Paramount at an archery tournament.

If it is a tournament at which you are not well-known by all the contestants, make it your business to become a friend to all so that every archer on the line will be thoroughly at ease and relaxed. Do all you can to *keep* your participants relaxed and calm because they are trying to shoot the best scores, and a state of confusion helps no one do his best.

On the day of the tournament, see that the targets are definitely assigned so that the contestants may practice at the distances they wish, always keeping in mind the safety angle. The rule book clearly states the procedure to be followed under the heading "Practice." Keep in mind that some archers may be shooting on a field and under conditions they might never have experienced in the past and their first practice may be very important to them. Be sure to check the time in order that at least two, and preferably three ends at the greatest distance may be practiced by all contestants before official scoring begins. Try to start on time but be generous and considerate on this point if necessary. Beginning a few minutes after the specified time may be necessary at times. Remember the traffic problems today often cause unavoidable delays. Also, the range may be new to some contestants and those few moments of extra practice may give them the confidence they need. There is no rule covering late entries to a meet. Be sure you have an understanding with those in authority before the tournament begins. At many major meets an archer is allowed to enter the tournament if he is late, without practice, and then is allowed to make up the ends he may have missed immediately following the completion of the round by the other contestants. If time and situation does not permit this, the ends missed must be sacrificed and scores recorded for ends shot only.

Be generous in your interpretation of the rules. For instance, at the start of the tournament, the rules say "the archers take their assigned places *at* the shooting line." This does not necessarily mean that the archers must be posed *on* the shooting line before the signal is given to shoot the first end. Keep in mind that no two persons are born with the same temperaments. We all have seen archers who are utterly calm, and we know others who are nervous and jittery at the beginning of a tournament although they may have attended dozens of tournaments over a period of years. For them, be sure you make an earnest attempt to do everything possible to follow the rules under the heading of "Shooting" in the rule book. Keep the spectators "at least 20 yards back of the shooting line." And a spectator is *any person not competing.* Be sure the archers themselves "remain at least three yards back of the line of shooting when not shooting." All excess equipment belonging to the contestants is at least four or five yards behind the shooting line to be out of the way.

It is a good idea to check to see that the target nates of each target have chosen their target captain, scorers, drawers and checkers, etc. While the rules do not state this, it is customary that the first named on the scoresheet is the target captain and he or she calls the value of the arrows and does the drawing. It might be pertinent to suggest here that the value of an arrow be called before the arrow is drawn from the target. It is easy to miscall unintentionally the value of an arrow, and this procedure gives you ample opportunity to correct any possible error in calling an arrow's value. The second and third named archers on the scoresheet usually record the scores on duplicate scoresheets. The last named person on the scoresheet checks the calling of the arrows as drawn, and then takes from the target captain the set of arrows and places them in the quiver of the contestant to whom they belong. After the scoring, all target mates should retrieve any missed arrows.

At the beginning of a tournament, talk to your contestants, point out a few of the unusual happenings on unfamiliar or new rules. Remember that it is the duty of the target captain to look over the target for arrows close to the lines before the target or arrows are touched by anyone or any object. After decisions are made as to close arrows, the target captain will then pull out and reinsert the "close arrow" into the correct circle. An arrow that has rebounded from the target is picked up and handed to the target captain who puts it into the red ring of the target. The same rule applies to arrows that have penetrated through the target. The target captain places the arrow into the blue ring.

Where there are four persons on a target, two shooting at the same time, it is customary that the first two named on the scoresheet shoot first and they are all followed by the last two named, spacing themselves far enough apart for comfortable shooting.

Many archers use the point of aim as compared with the sight method of shooting. Often the point of aim shooters are hurried in their P.O.A adjustment. Make them feel that you want them to take the time to set their points accurately. If it is necessary to hurry the tournament at all, it's better to speed them to and from the targets.

Remind the archers that an arrow which has left the bow and fallen beyond the shooting line may only be shot if the archer is able to reach it with her bow while standing in her shooting position.

Archery takes on necessary changes as it progresses; not only the sport itself but the equipment, number of participants, etc. It is up to the tournament official to keep abreast of the times and be refreshed on the tournament rules by following those of the present day.

There are a number of helpful and useful items that every efficient field officer should have with him. Essential first aid items such as bandages, adhesive tape, tincture of benzoin for use on blistering fingers, aspirin, and tissue paper are important, and you may wish to add to this list some kind of sunburn lotion. If an archer should break his bow while shooting and receive injury, here is the first aid treatment to be given: make an ice pack and apply directly to the injury. (Frequently cold soft drinks are served on an archery range and here you will find the necessary ice.) Keep the patient quiet and have him lie prone on the ground. When he has sufficiently recovered, remove him preferably on a stretcher and see that he is examined by a physician. The first aid procedure was prescribed by the late Dr. Robert P. Elmer.[1]

Be sure you know how tie scores are decided, even though there may be a scoring committee that handles this. You might be asked about this so remember that the highest score at the longest distance decides this question; the number of hits has no bearing on the matter. Consult the rule book for further details on this question.

Keep a written record of the actual starting and finishing times of the rounds shot as well as the number of contestants participating and other pertinent or unusual incidents. This information can be useful when formulating programs for future tournaments. An experienced field official should know how long it takes to shoot and score all rounds.

If you are going to be an archer official, try these suggestions. The participants will be enthusiastic and cooperative because they are having fun. But always remember that *safety is the first duty of every official and every archer.*

---

[1]Dr. Robert P. Elmer, author of *Target Archery.*

Atypical

Archery for the Physically Handicapped

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Bay City
Texas

Archery is fun, and certainly can help contribute to the happiness and well-being of the physically handicapped boy, girl, or adult. There are innumerable reasons for including archery in the physical education, recreation, or camping program of the physically handicapped. First, it will provide them with a skill that has much carry-over value; also, they can enjoy participation with physically normal friends. Archery equipment is not considered expensive and for this reason can be included in most school, camp, or recreation department budgets. Archery students may, in turn, purchase their own equipment and enjoy the sport long after class activities have ended. Availability of space is an important factor to consider in deciding whether an activity can be offered. The small space necessary for the construction of an archery range is certainly an advantage. Select a site where pedestrians will not be walking nearby. Also consider clearance to the rear and sides of the range. Arrows will be easily lost in tall grass or weeds and will be broken if hit into trees or buildings. Too, physically handicapped students may not have the extra energy necessary for spending long periods of time looking for lost arrows. Availability of the range is another factor to consider. Many types of handicaps restrict the amount of walking the student may do and for this reason the range should be easily accessible; a level area should be provided. Some provisions should be made for rolling wheelchairs to and from the area.

Archery is not too tiring an activity and affords an opportunity to develop good posture and strengthen weakened muscles. An archery class can be so conducted as to take care of even those children with no locomotive ability. At the same time, it can provide wholesome competition that need not be of too exciting a nature.

Equipment should provide for both those with very weak shoulder and arm muscles and those who have developed very strong shoulder and arm muscles as a result of long periods of walking on crutches. Arrows must be long enough, as control may be lacking for a rather long period of time. A piece of taut elastic may replace the bowstring during the learning period, when the correct draw is being taught. Without the resistance of the bowstring, correct technique

will be mastered without it proving nearly so tiring. The bowstring will replace the elastic as soon as the drawing technique has been mastered, the elastic being brought back in use whenever an error in technique need be corrected.

Chairs or benches should be provided for those who are not shooting. It is very difficult for a person with braces or one with poor balance to sit down and get up from the ground. Persons with very poor balance or with little muscle control may shoot with much greater ease and more accurately from a sitting position.

Whenever possible, the handicapped student's physican should be consulted as to the advisability of her participating in the sport. This may be of particular importance in the case of students with heart trouble. During this consultation, the instructor may receive information concerning particular needs of the students – strengthening particularly weak muscles, use of certain muscles, posture needs, etc. The particular student's technique in shooting would then be altered to best meet her individual needs. The emotional stability of the student may also be considered and her participation in even mild competition discussed.

Students using wheelchairs may be taught to shoot while sitting in their wheelchairs, while those on crutches may stand balancing on their crutches while shooting. An arm amputee may learn to draw and aim while another student holds the bow in position. The student drawing will, in turn, direct the student holding the bow to lower or raise it or to move it to the left or right for a better shot. The instructor or the physically normal student may assist the cerebral palsy cases by helping them steady the bow during the time they are shooting. These boys and girls may have better success in shooting from a sitting position. The student who fatigues easily may also have greater success while shooting from a sitting position. Those students who fatigue easily or who have difficulty with locomotion may also find it difficult to gather their own arrows. In these cases, the students may be recording scores or helping with organization while their arrows are brought in.

Care and repair of equipment certainly should be included in the course, and the handicapped student will be given additional confidence in her knowledge of and responsibility toward taking care of the equipment. Archery tournaments may be included or serve as a climax to the course. They should be so conducted as to not create great excitement. Those who have been instructed to abstain from competition may serve as tournament officials.

Physically handicapped boys, girls, and adults enjoy being part of a group and engaging in activity with others. Archery offers a splendid opportunity for them, not only in participation but they can actually excel. Treat the students as nearly like the physically

normal student as is possible. They like to be able to do for themselves, and even though the effort is great, the feeling of a job well done is adequate compensation. If special accommodations are necessary, carry them out in a matter of fact attitude toward the students' abnormalities. The teacher must have sympathetic understanding without the feeling of pity and depression which often accompanies lack of understanding. She must be alert to the students' needs without attracting attention to them – watching for broken braces, worn crutch tips or other difficulties which might present themselves.

Archery is fun, and there is no reason why the physically handicapped student or camper should not receive the joy that comes from active participation. There is no reason why they should not have that feeling of a job well done! Let's provide a well planned program of archery instruction through our schools, camps, and recreation programs. Let's go a step further and provide facilities and equipment which may be enjoyed in their leisure hours. Let *us* be able to say, "A job well done."

An Aiming Device for Teaching Archery to the Blind

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Sports participation is often taken for granted and is not commonly recognized as a vital "safety valve" for the handicapped as well as the nonhandicapped. A research survey reveals that participation in sports by the visually handicapped has been successful and has afforded rewarding experiences. Wrestling, track and field, bowling, gymnastics, swimming, and even golf, fencing, and archery are areas in which the visually handicapped do participate.

Archery, to be satisfying, must ensure a potential of success for the participants. The purpose of this study, then, was to develop a practical aiming device specially adapted for the blind which would facilitate the development of skill and enhance archery as a new and challenging sport.

With this in mind, the investigator experimentally designed and constructed an archery aiming device having potential as an effective aid for the blind. A limited pilot experimental demonstration provided data for implications and recommendations.

To evaluate the effectiveness of the developed aiming device, shooting records were planned using three methods of aiming: Method 1 – normal sighted; Method 2 – pole; Method 3 – photoelectric cell.

The normal sighted method of aiming is to shoot normally, with no adaptations.

The pole method, developed by Thomas W. Taylor, uses a pole as a guide for the blind person's hand. In his article, "The Unseen Target,"[1] he explains in detail the procedure used. He also carefully describes adaptation of target faces and a method of retrieving and scoring arrows. The investigator has used these excellent ideas.

The photoelectric cell method is the experimental aiming device developed by the investigator. The Teela-Wooket Archery Camp Seven Step Technique of Shooting was used by all participants.

The experimentally developed and adapted equipment involved in designing an aiming device and its use by the blind archer included

[1]Thomas W. Taylor, "The Unseen Target." *Journal of Health, Physical Education, Recreation, 24:6,15, June 1953.*

(1) photoelectric relay unit, (2) adapted bow and light source attachment, (3) electric projector pointer, (4) modified bowstring, and (5) foot pegs. Standard equipment used included (1) aluminum arrows, (2) quivers, (3) armguards, (4) finger tabs and gloves. A standard range was used with six set-ups for the experiment.

Photoelectric Relay Unit

The Welch Photoelectric Relay Unit, a basic piece of equipment in most physics laboratories, was used in the development of the aiming device. It operates when a light is flashed on the photo cell, then relays current to ring a six volt bell.

Bow and Light Source Attachment

The bows were equipped with an electric projector pointer which was mounted on the handle of the bow. The Zorn Jr. Electric Projector Pointer, normally battery operated, was wired so the flow of electric current would be steady and long-term. A Sawyer six volt electric transformer was wired to a block of wood the size of two number D flashlight batteries and inserted into the pointer to supply current. The electric cord passed through a hole cut in the pointer cap for this purpose. A light bulb with an arrow-shaped filament provided a small, parallel light source to activate the photoelectric cell of the photoelectric relay unit.

An aluminum, fan-shaped plate was screwed into the upper limb over the handle of the bow on the nonwindow side to support the electric projector pointer. It extended four inches in front of the bow and had a ¼ inch wide slot cut along the front endge. Two pipe straps held the pointer to the bow, with the front pipe strap fastened into the slot with a wing nut to allow it to be moved up or down for sighting adjustment.

Bowstring

A double nocking point on the bowstring was indicated by two ½ inch strips of adhesive tape both above and below the nocking point for the arrow. These were 1/8 inch in diameter to permit easy location of them by the blindfolded archer.

Foot Blocks

Foot blocks made of wood were constructed to form three sides of a box which each archer used to mark her foot position when it

was correctly established. They were placed on both sides of the shooting line to assure a comfortable width in stance and a parallel foot position in relation to the target.

Experimental Shooting Procedure

The experimental shooting was conducted as follows:

1. No blindfolds, shot two trial rounds normally, using vision.
2. Blindfolded, shot two trial rounds with the pole method.
3. Blindfolded, shot two trial rounds with the photoelectric cell method.

Two participants worked together as partners during the experiment to assist each other with the two experimental shooting methods. Each pair of partners shot Trial 1 using one of the three methods of aiming. They then rotated to the other two stations to complete Trial 1. The order of rotation was varied in order to confound the practice for improvement factor of a particular method of aiming. Trial 2 was conducted in a similar manner with pairs of partners starting at stations different from their starting station in Trial 1.

The following description cards were reviewed with the archers to insure understanding of directions.

POLE METHOD OF AIMING

1. Instructions to Assistant:
   a. Place the pole in a position in front of the shooting line (target side) so the archer's bow arm will comfortably reach it in a full draw position.
   b. Place the foot blocks in a stance position on the shooting line.
   c. Wrap a piece of adhesive tape around the pole at an approximate height for aiming.
   d. Guide the archer's hand to the pole.
   e. Check the archer to avoid overdraw of arrows.
   f. As archer becomes accustomed to aiming, guidance cues should be verbal, i.e.,
      Move your arm left
      Raise your hand
      Lower your hand

2. Instructions to Archer:
   a. Straddle the shooting line, placing your feet in the foot blocks. Partner stands with you as assistant.

b. Put your blindfold in place.
c. A modified Scholastic Round, consisting of 4 ends at 20 yards and 4 ends at 15 yards, will be scored following the learning session.
d. The knuckle of the middle finger of the bowhand should touch the bottom edge of the tape as a guide.
e. Upon release of arrow, keep contact with the pole.
f. Emphasize secondary draw, to eliminate creeping.

PHOTOELECTRIC METHOD OF AIMING

1. Instructions to Assistant:
   a. Place the foot blocks in a stance position on the shooting line.
   b. Place the photoelectric relay unit 20 feet in front (target side) of the shooting line with the photocell on the right side and facing the shooting line.
   c. Stand in the foot blocks and hold the bow, with the bowstring as a guide, and align the bowstring, center of gold, and center of photocell.
   d. Move the unit to the right, so the left edge is 24 inches from the alignment line just established.
   e. Turn the electric projector pointer on, and adjust the elevation with the wing nut to an approximate height.
   f. Guide the archer's hand so the light beam contacts the photocell.
   g. Then give only verbal cues, i.e.,
      Move your arm left
      Move your arm right
      Raise your arm
      Lower your arm

2. Instructions to Archer:
   a. Straddle the shooting line, placing your feet in the foot blocks. Partner stands with you as assistant.
   b. Put your blindfold in place.
   c. A modified Scholastic Round, consisting of 4 ends at 20 yards and 4 ends at 15 yards will be scored.
   d. Wait for a steady sound, then release.

As judged by the investigator, the eight participants in the pilot demonstration were skilled archers capable of consistent shooting in the normal situation as students in physical education archery classes and in archery club. Skilled archers were used because the aiming device was to be tested, rather than the teaching method.

The Rank-Difference Correlation Method was used to establish reliability for the three methods of aiming.

Six out of eight participants shot higher scores using the photo-electric method than they did using the pole method with those scores averaging 64.6 points higher than all the participants using the pole method.

The experimental aiming device was successful as indicated by the pilot demonstration; however, it should be tested by a larger group of subjects and by blind subjects. The six set-ups as designed for use in this study could be made available for such additional testing. If other archery enthusiasts are interested in further research in this area or additional information pertaining to the experimental aiming device, please direct inquires to LaVere Shaffer, University of Maine, Women's Physical Education, Orono, Maine.

Teaching the Blind Student Archery Skills

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Every student enrolled at Glassboro State College is required to take physical education for two years, including students who are physically handicapped. The feeling in the physical education department is that everyone should experience some form of physical activity; therefore, we conduct an individualized physical education program which meets twice a week for one hour. On one occasion early in the program, a blind student walked into the class ready to participate in some type of activity. I was completely panic stricken because I was unsure what to offer her. For the first several meetings we tried exercises and bowling with a plastic ball and pins. Neither activity interested or challenged the student then we tried archery, using the following procedure:

1. I obtained the right length arrows for my student and a light bow that she could pull. I had to consider that what little strength she had concentrated in her left shoulder and arm due to learning to go around with a cane.
2. I then proceeded to show her how to nock the bow to the arrow. In explaining the difference between the cock feather and the hen feather, it was just a matter of feel. She was also able to feel the nock indention.
3. At first, the arrows were placed in front of her, which made it possible for her to pick them up easily. Eventually the arrows were placed in a quiver, which was strapped around her waist. She was now able to manipulate the arrows as though she could see.
4. The next step was foot position. At this point it became apparent that if I could create an atmosphere of familiar surroundings for my student, she would begin to feel adequate. Therefore, it was necessary to construct a footboard that would put her feet and her body in the same aligned position with the target each time.
5. After her feet and body were in proper alignment, she was asked to nock the bow to the arrow. She then drew the bow until she felt the string touch her lips and her thumb was anchored to the jawbone. These movements were repeated many times. Once more I waited for her to feel these movements. There were times that I had to hold the drawing arm in place for her and guide the bow arm in a straight up-and-down relationship to the floor. This was stopped when I saw that she was able to make these movements by herself.

6. When it came to the actual shooting of the arrow, direction become a problem. Holding the bow arm straight up-and-down was an impossibility; therefore, I would stand behind her and direct the arrows. This created no independence on the part of my student. Then too, after all the arrows were shot, I had to lead my student to the target and tell her where the arrows hit.

7. I devised a towline. A rope was suspended from the middle of the top of the target to a nail that was attached to her footboard. This had a twofold purpose: it enabled my student to walk to the target by herself and permitted her to keep the bow straight up-and-down by placing it against the rope.

8. To create more independence, a system was devised so my student could identify her own arrows as they hit the target. This was done by covering each color of the target with an unusual texture of material. The materials were sandpaper for gold, satin for red, terrycloth for blue, cotton for black, and the white portion was left as is.

Now my student was able to approach the target, know how many arrows hit the target, and how many points she made. She would then go back to the footboard, record her score in braille, and be ready to begin the whole process again.

One score was three gold, two blue, and one miss out of six arrows. My student came to me and said, "You have given me an opportunity to gain self-confidence."

I cannot take full credit for this achievement. Without the efforts of a colleague and a member of the custodial staff, this would not have been accomplished.

Field Shooting

Field Archery

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Ames, Iowa

Field archery, in a sense, is doing what comes naturally. Originally, all archery was of a field variety.

Man apparently developed his skill in archery by randomly shooting at various objects throughout the forests or glades. Aboriginal man's style of shooting probably was of the bare-bow variety (instinctive). Aiming devices such as points of aim and sights are relatively recent inventions brought about by competitive shooting where arrow after arrow was shot at the same distance.

Repetitive shooting from one distance came into general use after the inventing of gunpowder in the days when military archers were needed; England had laws to prevent shooting successive arrows from the same distance. Man's original type of archery faded in Europe with the disappearance of the need for military archers and in America, with destruction of the American Indians' way of life.

Field archery today owes its popularity to the early hunting activities of such archery greats as Maurice and Will Thompson of Georgia and later of Crawfordsville, Indiana; Saxton Pope of California; and Art Young of Illinois. The many delightful hunting experiences of these men made exciting reading and helped increase interest in bowhunting and field shooting.

Field archery, as we know it today, started primarily with the formation of the National Field Archery Association (NFAA) in 1939. Before that time, field shooting had really consisted of random roving. Since 1939, field archery as a game has come into being and now has a following in the tens of thousands, and national tournament attendance at times approaches 2,000.

High School, College Programs

Field archery is well suited for physical education programs at both the high school and college levels. *First,* it offers a possibility for carrying the skill over into competitive sport in everyday life. In most states there is a trend toward greater participation in field archery. *Second,* the archery skills can be applied to bow and arrow

hunting, which now has a following of at least a third of a million sportsmen.

A *third* advantage is that field archery takes a person outdoors where one can enjoy nature at its best, including the scenic beauty, flowers, bird life, companionship, and the pleasures of shooting. *Fourth,* with archery courses usually laid out on relatively rough ground, participants are able to enjoy hiking, along with the physical exercise of shooting. These are the advantages in places where facilities are available for a regulation 14-target field round unit.

Field archery can be taught satisfactorily without a regulation 14-target unit available. At Auburn University the "Flint Round" layout of targets, requiring a maximum of 30 yards, was used very satisfactorily. A series of straw-bale target butts were set at the base of a high bank adjacent to the gymnasium. The shooting distances for each butt (20 feet to 30 yards) were then staked. Students were instructed in the bare-bow style (without aiming devices such as sights or point of aim) of shooting.

Other colleges are currently including classes of field archery with a general archery teaching program. This movement to broaden the scope and improve the quality of all types of archery is being promoted by Operation Archery, a phase of AAHPER's Operation Fitness – USA.

Modified Flint Round

In order to make it possible to shoot an indoor field round, even where only 20-yard distances are available, Operation Archery adopted the Modified Flint Round as the most suitable round for physical education purposes. The round, however, was set up with 12- and 18-inch faces instead of 6- and 8-inch faces, as called for in the official round. The layout, except for target face sizes, follows regulations for the Modified Flint as published in the *Official NFAA Handbook.* Shooting stations 1 through 7 can be marked with adhesive tape placed on the walls or at the outer edge of the floor.

Usually a class must hustle in order that each student may shoot her total of 28 arrows and properly score the results. Field archery rounds of course are shot on field faces. These have an outer 3-point scoring ring, an inner 5-point scoring ring, and a central aiming spot. Each end consists of 4 arrows with a maximum score of 4 hits for a total of 20 points. In scoring, arrows are not itemized separately as they are in target archery. You do record total hits and total score for each end (example: 4 hits for 16, 3 for 9, etc.).

OPERATION ARCHERY "MODIFIED FLINT FIELD ROUND"
(total of 7 targets with 12-inch and 18-inch faces, total of 28 arrows)

Shooting Distance	*Number Arrows*	*Target Size*	*Hits*	*Score*	*Shooting Station*
17 yds.	4	18 in.	.....	.....	1st
20 ft.	4	12 in.	.....	.....	2nd
20 yds.	4	18 in.	.....	.....	3rd
14 yds.	4	12 in.	.....	.....	4th
15 yds.	4	18 in.	.....	.....	5th
10 yds.	4	12 in.	.....	.....	6th
20,17,15, & 10 yds.	1 at each distance	18 in.	.....	.....	7th
Total	28		.....	.....	

Four arrows are shot from each of stations 1 through 6. Note that shooting at the larger face is from the odd-numbered and the smaller face from the even-numbered stations. The 7th and last end consists of 1 arrow shot at the 18-inch face from each of 20-, 17-, 15-, and 10-yard distances. This is known as a 4-position shot (also called a walkup shot).

Bare-Bow Technique

It is recommended that the bare-bow (instinctive) technique of shooting be taught in field archery. Target archery techniques, including the use of point of aim or sights, are taught in target archery sections so there is no need to cover them here.

The fundamentals of good technique are just as important in field as in target archery. Good form and consistency in anchoring, aiming, holding, releasing, and following-through are essentials that must be drilled into the student until good form becomes automatic. Aiming is included as a fundamental even though no mechanical devise is involved. Aiming is a matter of "feeling" or sensing that the arrow is properly directed to hit the mark at which the shooter is looking.

Finally, field archery lends itself well to teaching in physical education. It can easily be taught in a gymnasium with a maximum shooting distance of 60 feet. If an outdoor range is available, all the better.

The Appeal of Field Archery

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Appeal from Prehistory

Field archery is a natural for inclusion in physical education instruction because it offers an opportunity to relearn a type of archery practiced since time immemorial. It cannot be determined exactly how or when archery began, but archaeological evidence shows that the use of flint-tipped arrows goes back at least 25,000 years in southern France. Bows have been used in America since they were brought here as weapons by the first race of men to invade the continent, coming from Asia through the Alaska area about 20,000 years ago. Field archery, accordingly, originated in prehistoric times as a form of hunting archery.

The degree of accuracy and the style of shooting used by the earliest aborigines is still a matter of speculation, but it is certain that ancient man developed an instinct for hitting the animal or the mark at which he shot. Today we refer to such instinctive shooting as bare-bow archery because the bow is bare of any sighting device. Such shooting is truly primitive shooting with a primitive weapon, which is perhaps why field archery is so fascinating and bowhunting appeals to so many people.

Carryover Values

Field archery offers lasting values to the participant. In shooting, one learns not only the techniques of shooting but self-control and coordination as well. Shooting also teaches a valuable lesson in life because, if the shooter misses the mark, he has only himself to look to for the cause of the failure. Here is a sport which entices many participants to keep active in healthful outdoor physical exercise and which can be enjoyed for the rest of one's life. Bowhunting, competitive shooting, and ability to judge distance are additional carryover values from field archery. As a sport, it is suitable for family participation, for everyone from children to grandparents.

Shooting Area

Today there are several rounds to choose from for teaching field archery. If space is limited or weather forces the class to work indoors, the round used may consist of the Operation Archery Modified Indoor Round, which requires shooting distances only up to 20 yards, or the 30-yard regular Flint Round. These rounds may also be used outdoors. They require an area no larger than a tennis court. Where an unused area of about 10 acres is available, a regular 14-target field course may be set up. As a final test of skill, all archers will want to experience some shooting on a regular field course where one is available.

For beginning field archers, the Operation Archery Modified Indoor Round has much to offer. It is like the regular 20-Yard Indoor Round but utilizes 12-inch faces in place of the usual 6-inch faces and 18-inch faces in place of the 8-inch faces. The larger faces offer larger marks to shoot at and hit, thereby stimulating interest and courage in beginners.

OPERATION ARCHERY MODIFIED 20-YARD INDOOR ROUND
(total of 7 targets with 12-inch and 18-inch faces, total of 28 arrows)

Shooting Distance	*Number Arrows*	*Target Size*	*Hits*	*Score*	*Shooting Station*
17 yds.	4	18 in.	.....	.....	1st
20 ft.	4	12 in.	.....	.....	2nd
20 yds.	4	18 in.	.....	.....	3rd
14 yds.	4	12 in.	.....	.....	4th
15 yds.	4	18 in.	.....	.....	5th
10 yds.	4	12 in.	.....	.....	6th
20,17,15, and 10 yds.	1 at each distance	18 in.	.....	.....	7th
Total	28				

Four arrows are shot from each of Stations 1 through 6. Note that shooting at the larger face is from the odd-numbered and the smaller face from the even-numbered stations. The seventh and last end consists of one arrow shot at the 18-inch face from each of 20-, 17-, 15-, and 10-yard distances. This is known as a four-position shot (also called a walk-up shot); distances for the walk-up shot differ slightly from the regular 20-yard Indoor Round.

Where the round is set up indoors, the seven shooting station distances can be marked with numbered pieces of adhesive tape placed on the walls or at the outer edge of the floor.

Students just keep hustling if they are to shoot their total of 28 arrows and score results in a single class period. There is plenty of time to shoot with care and patience, but there is little time for idle chatter and inattention.

Bare-Bow Field Archery Teaching

In order that students may have the pleasure of knowing and enjoying archery in its most basic and primitive form, it is recommended that bare-bow (instinctive) shooting be taught. By learning bare-bow archery first, one has the best opportunity to get the most enjoyment from this form of shooting.

There are seven fundamentals for shooting which are basic to all forms of archery. They include (1) standing, (2) nocking, (3) drawing, (4) anchoring, (5) aiming, (6) releasing, and (7) following through. Bare-bow archery techniques, however, differ from target shooting in that the anchor point is at the side of the face, with the nock end of the arrow near the corner of the mouth, instead of under the tip of the chin as in the case in target shooting. Bare-bow shooting also differs in aiming technique; aiming is mostly by intuition rather than by mechanically lining up with a sight or a point of aim.

For teaching beginners to hit the mark more quickly at ranges up to about 30 yards, it is recommended that the pre-draw gap system of aiming be used.[1] This system is based on the fact that most bows worthy of use in teaching will shoot arrows that will fly on a level, with little or no trajectory, for a distance of up to about 25 yards. This fact allows the archer to determine his aim for elevation even before he draws his arrow. As an example, the author, with his arrow nocked and the bowhand extended toward the target, and with the drawing fingers on the string but not yet drawing the string, can sight the tip of his arrow at an imaginary spot about 12 inches below a 12-inch face at 20 yards. If he then draws the arrows, anchors at the corner of the mouth, and releases the arrow without having allowed the bowhand to move during any part of these three acts, he will usually hit at the desired elevation. You may have to adjust for your tackle and your style of shooting, but with practice you will find it will work for you, too.

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[1]Arnold O. Haugen and Harlan G. Metcalf, *Field Archery and Bowhunting* (New York: Ronald Press Co., 1963).

Scoring

Field archery faces consist of two scoring rings and a central aiming spot. Hits in the outer ring each count three; each hit in the inner ring and spot counts five. The maximum score per target in field archery (four arrows are shot) is 20 points, or 140 points for all seven targets in the Operation Archery Indoor Round. In the regular Field Round unit of 14 targets, the perfect score would be 280. Arrows cutting into two scoring circles are given the higher value.

Student Enthusiasm

If student enthusiasm buoys you up, try offering one or more sections in bare-bow field archery. You will be amazed at its acceptance and the demand for this form of archery. It has been done elsewhere with great success, so why not at your school? Teaching people to have fun and to create a desire to continue shooting a bow in years to come is most important. Shooting top scores is only of secondary value.

Schoolyard Field Archery

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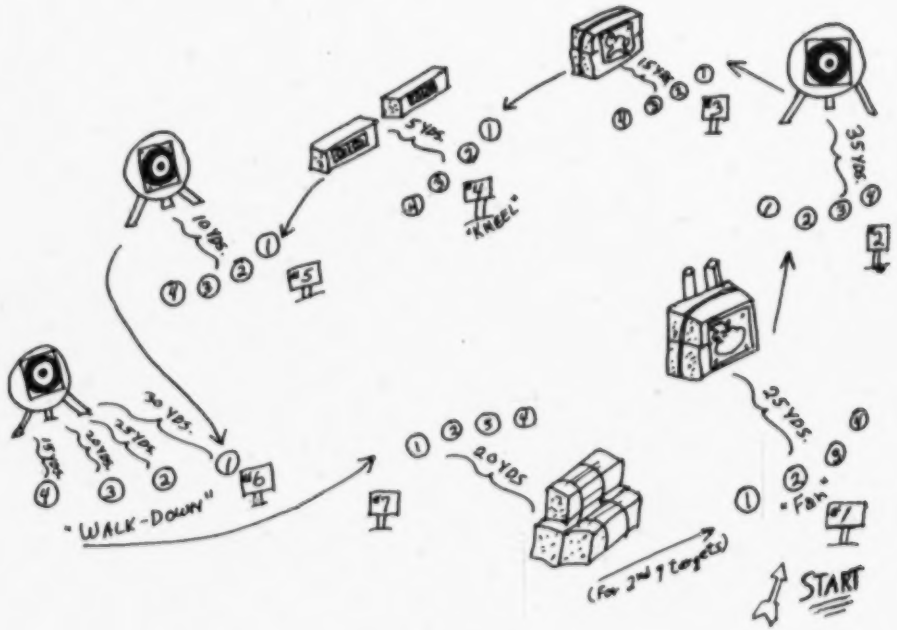
Field archery is one of the fastest growing competitive sports in America. It differs from target archery in that the targets are placed at various distances and the archer must move about the course.

There are three official outdoor rounds, each with specific types of targets and distances. There are also modifications for intermediate and junior archers which incorporate the basic 14 targets as a unit, with two units constituting a round. If your school is considering such a field course, the information may be obtained from the National Field Archery Association, Box 514, Redlands, California. This article, however, is for the physical education teacher who has limited or nonexistent indoor facilities and is considering the use of the out-of-doors.

With some ingenuity, an acceptable seven-target course can be set up on a baseball field in the fall or on the football area in the spring. Other practice or fringe areas can be included when uneven ground or minor obstacles are viewed as an advantage in selecting the site. Targets may be fixed or moveable. Hay bales make good all-weather butts; however, care must be taken to stack them in such a way that the binding twine will not be cut by arrows. Field target faces may be purchased or made and fastened to the butts by means of long eaves-trough nails or twisted pieces of metal coat hangers. Pasting faces to heavy cardboard will prolong their usability. Shooting positions may be marked by means of short stakes driven into the ground and numbered or by using dry barn lime in a six-inch circle to indicate the spot. Lime may also be used to mark target positions if stands must be removed after class.

Each teacher should feel free to develop her own schoolyard field course while keeping in mind the following points:

1. Seven targets should be laid out.
2. Distances of 5, 10, 15, 20, 25, 30, and 35 yards should be arranged in mixed order and blended into the natural terrain.
3. Provisions for 14 targets may be made by using two position stakes (e.g., red stake for the first time around the course and white for the second).



Suggested Field Archery Course—7 or 14 targets.

4. Target faces of the black and white type or animal type may be used. Pictures from magazines or student's sketches lend interest. Scoring is marked on the face: three for the outer ring, five for the inner ring, and 5x for the spot. The "x" is recorded to aid in breaking ties and does not add to the total score.
5. Target faces and distances should be standardized as follows:
   24-inch face with 12-inch bull and 4-inch spot at 30 and 35 yards.
   18-inch face with 9-inch bull and 3-inch spot at 25 and 30 yards.
   12-inch face with 6-inch bull and 2-inch spot at 10 to 20 yards.
   6-inch face with 3-inch bull and 1-inch spot at 5 yards.
6. Walk downs, fans, and four positions all lend variety.
7. Kneeling positions or standing with one foot resting on a log give further interest to natural terrain; trees, rocks, and posts make novel hazards.
8. Allow 20 yards clearance or a rise of ground behind all targets.
9. Archers should shoot in groups of four.
10. Bales should be tied together and may be fastened to trees, posts, or backstops for use as butts.
11. A practice butt, with tile distance markers level with the ground to prevent mower injury, should be provided.

The Scholastic Field Archers Round should be of interest to the physical education teacher whose outdoor facilities are too limited to attempt official archery rounds or a field course. A few hay butts or target stands, 30 yards of distance, and a range width suitable to class size is all that is required. Lines should be made at distances of 10, 20, 25, and 30 yards. The rules for this seven-target unit are:

1. Any straight or recurved bow and any standard target arrow may be used. No crossbows or broadheads are permitted.
2. Groups of no more than four archers may shoot at a single target at one time.
3. Four arrows constitute an end.
4. All archers shoot from the same distance at the same time and the distances are changed for each end (e.g., first end, 25 yards; second end, 10 yards; third end, 30 yards; fourth end, 20 yards; fifth end, 25 yards; sixth end, 10 yards; seventh end, 30, 25, 20, and 10 yards, one arrow at each distance).
5. The scorecard should include the archer's name, the number of each end, the total points made on each end, the number of spots hit ("x"), and the total for the seven targets.

Variety

Novelty Events

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Archery is one of many elective activities offered by the physical education department at Hood College during the fall and spring. The novelty events described in this article have been selected from a mimeographed collection created by archery students in the last two years. This collection is available to anyone interested in ideas for archery classes and recreation situations. The author suggests that developing your own collection of this type is worthwhile "rainy day" activity for an archery class. It results in group action within the class and stimulates creative thinking within the framework of a specific activity.

All of the following events require the archer to have the usual equipment: box, six arrows, quiver, armguard, and finger tab.

Archery Relay to Improve Skill

Created by Priscilla Allyn, Jean Marcon, Joan Shinnick

1. Equipment: One target for each team.
2. Position: Standing at shooting line in correct position. Team members line up three feet behind the girl shooting. One person from each team shoots at a time.
3. Distances: 20 yards–first round
   30 yards–second round
   40 yards–third round
4. Number of players: No more than five on a time with an unlimited number of teams.
5. Scoring rules: 20 yards–Each person uses six arrows and tries to hit the gold. As soon as the first archer hits the gold, she goes to the end of the line and the second person shoots. No more than six attempts may be made by each player. Since the object of the game is for each player to shoot one gold as soon as possible, the team winning the round is the team which first completes the shooting requirement. A team may finish shooting before the other teams, but if one of its players has missed the gold with all six arrows, it could not be the winner unless the other teams also have missed the gold. Arrows are retrieved after all teams have finished.

30 yards–The same thing occurs except that a player may hit the red or gold.
40 yards–The same as at 20 yards, but the player may hit the blue, red or gold. Arrows going through or bouncing off a target do not count.

Archery Tic-Tac-Toe

Created by Pat Anderson and Jeanne Perkins

1. Equipment: One target for each team covered with a tic-tac-toe board about three feet square.
2. Distance: 40, 30, and 20 yards.
3. Safety: All must stand behind the line and observe the usual safety rules.
4. Number of players: Five targets with four people per team.
5. Scoring: At 40 yards–The first team to get three in a row gets 15 points.
   At 30 yards–10 points.
   At 20 yards–5 points.
   The first team to get 90 points wins.
6. Rules: One person from each team shoots at a time. Each person shoots only one arrow for each end; two ends are equal to one game. If all four archers on the team fail to get three in a row after shooting the two ends, they retrieve their arrows and begin again until one team gets three in a row.
7. Penalties: Failure to observe the rules–five points subtracted from total score for a major offense; three points for a minor one.
   Major offense–Shooting too many arrows or stepping over the line.
   Minor offense–Any other infractions of the rules.

Balloon Pop

Created by Sally Buchanan, Sarah Gallagher, and Barbara Stolp

1. Equipment: Cloth to cover targets. Balloons–four of each color, red, blue, and yellow, for each target.
2. Position: Standing at the shooting line in correct position, and at a 20-yard range.
3. Number of players: Four per target.
4. Scoring: One point for each broken balloon.
5. Penalties: One point subtracted for each balloon missed and for each balloon broken in the wrong row.

6. Rules: Each participant shall shoot one arrow in her turn at each horizontal row of balloons. Start at the top row.
   Object: To break all balloons of one color in one row using four arrows, one for each archer, then repeating for the next two rows.

Color Shoot

Created by Jane Buckler

1. Equipment: One target for each team.
2. Distances: 20, 30, or 40 yards, depending on the experience of the archers.
3. Number of players: Five or six players per team with an unlimited number of teams.
4. Position: Stand at shooting line in correct position.
5. Rules and procedure: One person from each team shoots at a time, using all six arrows in her turn. The first person on each team shoots one arrow and goes to the target and scores this one arrow. Then this archer, and all of her team, will aim for that particular color. Each team may be aiming for a different color. If the first archer for a team should miss the target on her first shot, she shoots until she hits the target. The petticoat is considered a miss. Each miss, until the target is hit to establish an aiming color, scores as minus one point. Each hit in the aiming color counts two points. Hits not in the color aimed for do not count. An arrow which cuts two colors counts as a hit if the higher of the two colors cut is the aiming color for that team. The individual scores on the team are totaled to give the team score.
   When each team member has shot six arrows and the score is totaled, the original first person becomes the last, and the original second person becomes the new first archer. This first archer now shoots one arrow to establish the aiming color for her team.
   In case of a tie, the teams involved will have their first archers establish an aiming color and shoot their remaining five arrows. If a tie still exists after the points are totaled, both teams receive prizes.
6. Officials: A captain should be appointed who will arrange the teams and the order of shooting. Her responsibility will also include blowing the whistle for the first archers to shoot and retrieve their first arrows, and to blow the whistle for each group of archers to shoot, and again to retrieve, their six arrows.

Musical Arrows

Created by Carol Hottenstein and Rae Utz

1. Equipment: A record player, records, and a long heavy-duty, outdoor extension cord will be needed.
2. Rules: All standard rules of safety should be followed. When the music starts, each archer shoots and continues to shoot until the music stops. At this time, the arrows are retrieved. The archer then moves to the next target. When the music starts, shooting continues. If all six arrows have been shot before the music stops, the archer steps back from the shooting line.
3. Target faces and scoring:
   #1–Arrows which hit the red count one point; all others, zero.
   #2–Arrows which touch any part of the animal count one point.
   #3–Arrows which hit the white count one point; all others, zero.
   #4–Arrows which hit the black count one point; all others, zero.
   #5–Same as #2.
   #6–Arrows which hit in the blue count one point; all others, zero.

   A scoresheet is needed for each archer which provides a space for her score at each target. Scoresheets travel with the archer. A nonshooting scorer should be assigned to each target.

Archery Bingo

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In this indoor or outdoor novelty shoot, students shoot six arrows from a distance of 20 yards into the special target, trying to hit numbers to correspond with the numbers on the scorecards.

Rules

The arrows must be shot into the scoring box to count; if they hit on a line no score is recorded. Only one arrow in each box will count unless a box is hit which has a choice of two numbers (see Figure 1). If one arrow lands in a box which has two numbers, either one or the other number may be used; but if two arrows land in a box which has two numbers, both numbers may be used.

5	6	15	3	20	13
10	4 or 12	16	25	9	7 or 22	19
21	18	1	12	5 or 18	11
4	13 or 21	22	15 or 20	24	2	9 or 16
8	14	2 or 23	7	17	23

Figure 1

B	I	N	G	O
3	10	11	17	23
1	7	13	19	21
2	6	free	16	25
4	9	15	18	24
5	8	12	20	2

Figure 2

Scoring

As arrows are removed from the target, the corresponding number is crossed off the scorecard. A game is won when any row of

numbers is crossed off. The row may be horizontal on the scorecard, or it may be a vertical row extending down the scorecard, or a diagonal one across the scorecard. If the archers are trying to "black out" the card, all numbers must be crossed off.

Equipment

Targets: The special target can be constructed of regular brown wrapping paper 36 inches x 50 inches, marked off in various sized squares with numbers inserted in each square. (The wrapping paper was found to be very durable when the arrows were removed carefully.) The numbers may be put on with crayon, paint, or a marking pen, and are arranged so that no numbers in a line on the cards are grouped on the target. When shooting outdoors, the special bingo target face may be round and made to correspond with the size of the official target (four feet in diameter). When shooting indoors, a square target may be made (see Figure 1) and should be placed on the butt or straw backstop so that there is ample room on the backstop to catch arrows which miss the outside numbers. The square target face may be pinned or stitched on the straw backstop

Scorecard: A ditto or stencil can be made to hold four bingo cards (4½ inches x 5½ inches each); each of the four cards will have a different sequence of numbers just as traditional bingo cards are different from each other. Figure 2 shows one of the four scorecards, while Figure 3 shows a different sequence. After the ditto is

NAME_____

DATE_____ ROUND_____

Points Scored Per Arrow							hits	score
B	I	N	G	O				
1	7	11	19	21				
3	10	13	17	23				
2	9	F	24	20				
4	6	15	18	25				
5	8	12	16	22				
B	I	N	G	O				
3	6	12	20	25				
2	8	11	17	22				
1	7	F	16	24				
4	9	13	18	23				
5	10	14	19	21				

Figure 3

(On a complete regular scorecard four sequences and a line for totals are included.)

run off, the cards must be cut on a paper cutter. Instead of making dittoed copies of the bingo cards, the regular scorecard can be used by having the students or instructor fill in numbers in the squares before shooting begins (see Figure 3).

Observations

This novelty shoot was done the eleventh week of a sophomore beginners archery class at Southern Illinois University. Three to four ends of six arrows each were required to complete a bingo; and eight to ten ends of six arrows each were required for a "black out" on the bingo card. Two games and almost one "black out" could be played in a 35-minute period indoors.